

Block

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INTRODUCTION TO FIRST AID

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BLOCK INTRODUCTION

First aid is the immediate essential care which is provided during emergency. With the boom of an era of knowledge and information technology, one feels the need to acquire knowledge and skills to deal with common emergencies and situations which require first aid. When learning and giving first aid, a person must acquire some essential qualities and portray responsibilities to act as a first aid provider. He or She can be anyone but knowledge, skill and attitude can easily differentiate a first aid provider from the crowd during emergency. If you are a first aid provider you need to acquire skills and develop understanding about basic principles and rules of first aid and your roles and responsibility while giving first aid. You must be confident in dealing with the human body and be informed about your own and the victims safety to whom you give first aid.

These areas are very basic to giving first aid and acting as a first aid provider but essential enough to act responsibly while saving some ones life. Thus, in this introductory block of first aid we shall study the concept of first aid and first aid provider, the human body and safe practices to be followed when giving first aid.

This block consists of 3 units as follows:

Unit- 1 focuses on first aid and first aid provider;

Unit-2 discusses the human body in detail; and

Unit-3 deals with safety practices to be adhered to while giving first aid.

Thus, this block will give you an insight into your role while giving first aid and develop understanding on human body that you have to care for and precautions you have to follow when giving first aid. Let us now begin reading the introductory block and its units and develop basic understanding of first aid.

UNIT 1 FIRST AID AND ROLE OF FIRST AID PROVIDER

Structure

- 1.0 Introduction
- 1.1 Objectives
- 1.2 First Aid
 - 1.2.1 Definition and Meaning of First Aid
 - 1.2.2 Scope and Purposes of First Aid
- 1.3 First Aid Provider
 - 1.3.1 Definition and Qualities of First Aid Provider
 - 1.3.2 Responsibilities of a First Aid Provider
 - 1.3.3 Principles /Rules to be kept in mind by First Aid Provider
- 1.4 Considerations for a First Aid Provider
 - 1.4.1 Good Samaritan Laws
 - 1.4.2 Legal Issues
 - 1.4.3 Ethical Issues
 - 1.4.4 Emotional Issues
- 1.5 First Aid Box
 - 1.5.1 Definition and Purposes
 - 1.5.2 Basic Items in First Aid Box
- 1.6 Let Us Sum Up
- 1.7 Key Words
- 1.8 Answers to Check Your Progress
- 1.9 References and Further Readings

1.0 INTRODUCTION

Emergencies can occur anytime. You may be at home , at your office , travelling or relaxing. Some emergency situations can be handled while some may be difficult to deal. You require knowledge and skills to deal with these problems and conditions occurring now and then. These situations can affect your loved ones, your friends, neighbours as well as you or even complete strangers whom you donot know. During the time of emergency, many a times we as human beings feel responsible and want to help the person affected by the emergency condition. These situations may even require a common man to show bravery, alertness and active spirit to care for and help the person in need. Thus, the concept of First Aid and First Aid provider arises from a basic idea which is to provide some initial help to a person in need until proper medical care can be provided.

A First Aid provider can be anyone. He may not be from medical or nursing profession but he/she is the one who can start the first care to the victim before the professional help arrives. It is important to remember that each victim needs to be handled and approached carefully and with great attention till the medical assistance is made available. Any action taken on spot should contribute to save life and to prevent further injury and complication. Thus, the role of first aid and

first aid provider is important in providing initial care to the person in need. In this unit, we shall be studying about first aid, its use, first aid provider and his role. We shall also discuss various issues and concerns that the first aid provider will face while giving first aid and how to deal with them. We shall also be studying about first aid box and various items in a first aid box. So let us begin our discussion.

1.1 OBJECTIVES

After completion of this unit, you shall be able to:

- define First Aid, First Aid provider and First Aid Box;
- explain meaning, purposes and principles of First Aid Provider;
- discuss the Responsibilities and Qualities of First Aid Provider;
- enumerate various issues and considerations to be taken care by a First Aid Provider; and
- describe the First Aid box.

1.2 FIRST AID

First aid involves various actions which are undertaken when required in situations of emergency due to accident, fall, injury, diseases or any other causes which threatens safety and well being of the person in need (victim). The situations which require first aid can occur anywhere and immediate treatment can improve the condition of the victim.

1.2.1 Definition and Meaning of First Aid

First aid is the care and assistance which is given to a person in need /victim/ casualty immediately in a situation where he/she has met an accident, falls or any other problem, which requires immediate attention. (Fig. 1.1)



Fig. 1.1: Providing First Aid

In simple words, first aid is immediate /first care given to any person who has encountered an emergency. Emergency can be anything, it can be injury, fall, person who has fallen sick and so on. First aid is hence, first assistance provided using available supplies and materials before regular medical help comes.

In first aid, the person is assessed, appropriate interventions are started to sustain life and reduce further damage until taken to hospital where life saving procedures are then started by the medical and nursing professionals. You may encounter various situations like heart attack, bites, falls, bleeding and so on where immediate care called as first aid needs to be applied. Your knowledge of first aid will help you to provide first aid.

1.2.2 Scope and Purposes of First Aid

In this section, we will discuss scope and purpose of First Aid.

Scope of First Aid

The scope of First Aid is wide and first aid can be applied in varied situations and conditions. Let us look at the scope of First Aid as described in following points:

- To find out the nature of situation and the condition of casualty who needs attention.
- Applying first aid most suited to the situation and as per requirement until medical aid arrives.
- Shifting the victim to a suitable hospital or medical institution.
- To use first aid in various situations that may occur on road , street , home, factories, workshops, floods, earthquakes, drought, landslides and so on.

Purpose of First Aid

The various purposes of first aid are to :

- preserve life of a victim/casualty.
- promote recovery.
- prevent further injury or damage.
- prevent complications related to injury or illness.
- maintain comfort of the victim.
- help the victim to reach regular medical care at the earliest.

Thus, **first aid** is important to preserve life and it is even more important that the knowledge of first aid is gained so that anyone can provide first aid as and when required. When trained in first aid, one can provide first aid to anyone in any emergency situation and the trained person is called as **First Aid provider**. The role of First aid provider is quite crucial which will be discussed in the next section.

First Aid is the first care which makes difference between life and death.

1.3 FIRST AID PROVIDER

In the previous section, we talked about first aid and why it is important to know how to give first aid. In this section, we shall discuss the role of first aid provider. By now you must have had an idea about first aid and the one who provides first aid is the first aid provider. Let us know more about the roles and responsibilities of the first aid provider. These have been discussed in the following subsections.

1.3.1 Definition and Qualities of First Aid Provider

Definition

A First aid provider can be any person who has been taught first aid and provides immediate treatment to the victims/casualty/persons in need at the time of

emergency/accident or any other mishap or if the victim has fallen sick. First Aid provider acts by providing first aid care to maintain safety and getting medical help on time to promote and preserve life of the victim.

Qualities of a First Aid Provider

A first aid provider should have many qualities (Fig. 1.2). These include:

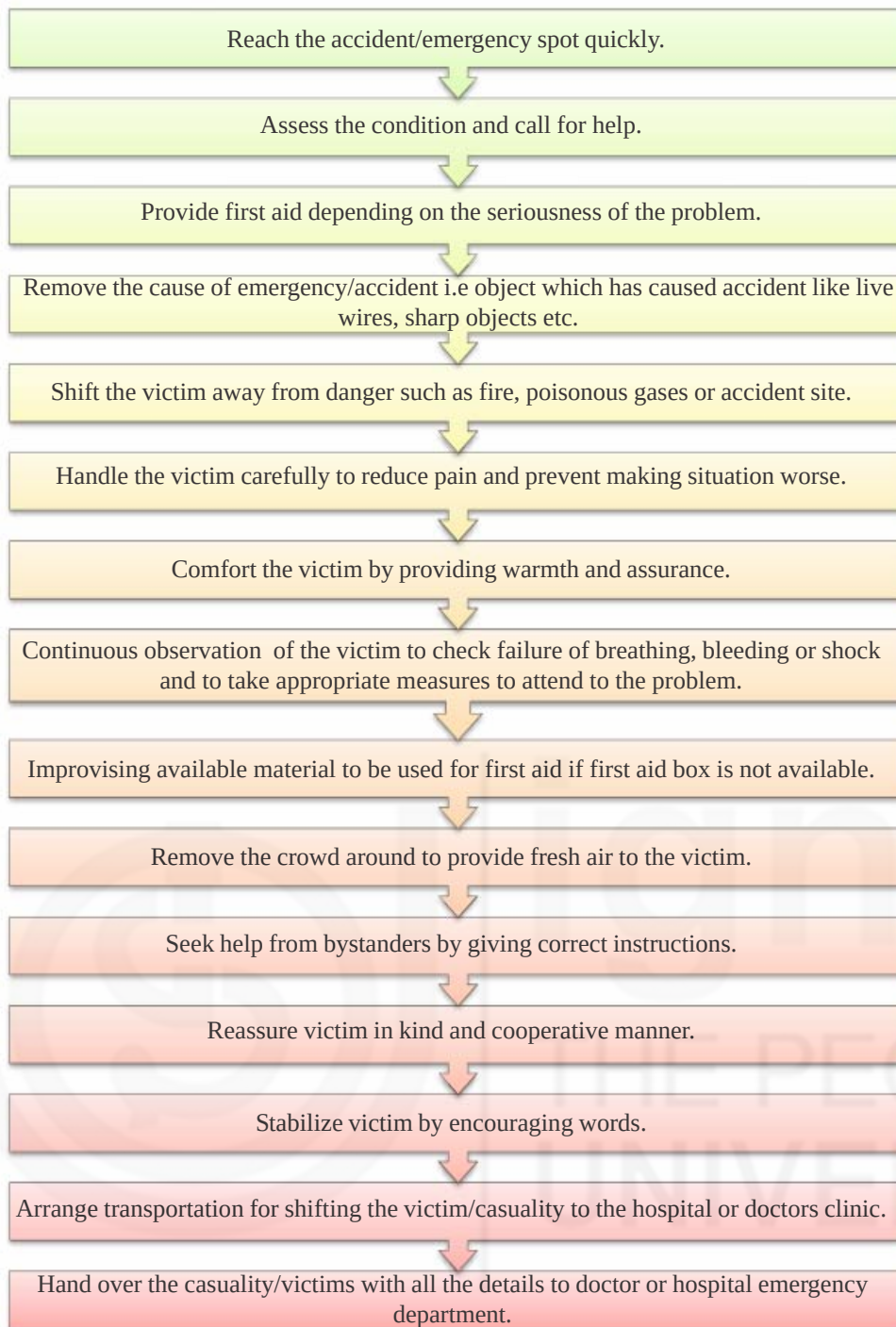
- Be calm in emergency situation.
- Never be nervous or panicky if coming across a person who needs first aid.
- Must observe everything carefully.
- Must act promptly.
- Utilize good judgment.
- Be cool and confident.
- Control the crowd.
- Ask onlookers to help.
- Request someone around to call for help.
- Must have patience.
- Must have tact to deal with anxiety of the victim, victim's relatives and friends.
- Have good knowledge and skills to apply first aid.



Fig. 1.2: Qualities of a First Aid Provider

1.3.2 Responsibilities of a First Aid Provider

While giving first aid or attending to any emergency or illness, the first aid provider has the following responsibilities:



Note:

Besides these responsibilities, the first aid provider is also responsible to shift the victim to an appropriate health centre or hospital. He/she must be well versed with the details of nearby hospitals/health centers/institutions and organizations to approach at the time of emergency. These details have been provided in Appendix 1 at the end of this unit for your ready reference. Various situations and emergencies requiring first aid have been discussed in Theory Block 2, 3 and 4 in detail.

1.3.3 Principles /Rules to be kept in Mind by First Aid Provider

When providing first aid, keep the following principles/rules in mind:

- Do first things first, quickly and calmly.

- Don't waste time in unnecessary questions.
- Decide the priority of first aid measures based on victim's condition.
- Initiate first aid without making any delay.
- Always be watchful for your personal safety.
- Do not put yourself in risk by attempting heroic rescues in hazardous circumstances or in any serious situations.
- Maintain control on emotions.
- Don't give anything to drink to an unconscious or semiconscious victim.
- Don't wake up an unconscious victim by slapping or shaking.
- Call for medical assistance immediately.
- Use safe practices while giving first aid care (Discussed in Unit 3 of this Block).
- Help in transportation of the victim to the hospital or medical facility (Discussed in Unit 2 of Theory Block 2).

Thus, you can see that a first aid provider has various roles and responsibilities. Also, the first aid provider needs to follow various principles while giving first aid. Hope this section has given you an insight into who the first aid provider is, what he/she does and what are the principles the first aid provider has to keep in mind while giving first aid.

The next section will deal with the various issues and concerns that a first aid provider needs to consider while providing first aid care.

Check Your Progress 1

- 1) Define First Aid and First Aid provider.

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- 2) What is the scope of First Aid?

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- 3) List any five qualities of First Aid provider.

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1.4 CONSIDERATIONS FOR A FIRST AID PROVIDER

The first aid provider needs to consider various aspects and issues when providing first aid. Since, first aid is a care given in emergency situation and is the first care provided to the victim, you as first aid provider may have various issues in mind like: Should I give the care?, Will I be able to give first aid?, What will happen if the victim's condition doesn't improve after my first aid?, Will the police catch hold of me if I give first aid to a hit and run vehicle accident victim? You may also feel incompetent or afraid to give first aid in worse emergency situations and even on knowing how to give first aid you may choose to slip away to avoid problems. These are important issues and you must know about them deeply. Let us discuss them in detail.

1.4.1 Good Samaritan Laws

Let us study these laws in the following subsections.

Meaning of Good Samaritan Laws

These are laws that safeguard the actions of the first aid provider.

A 'Good Samaritan' is a person who is usually the first aid provider who gives First Aid to a stranger in emergency. Every first aid provider is a Good Samaritan.

'Good Samaritan Laws' means laws which guide and protect the 'Good Samaritan' i.e. First Aid provider when giving first aid. According to these laws, every first aid provider has the duty to be careful and responsible in his actions while helping the victim. The first aid provider should give first aid free of cost, act carefully and must not harm the victim. When first aid is given in such a manner the first aid provider is not guilty of anything even if any mistake/error occurs while giving first aid. Hence, the first aid provider is legally protected.

Let us understand the Good Samaritan Laws by an example which is sighted here:

A person in a good faith provides first aid without any payment or expectation of payment at the site of an accident or emergency shall not be held responsible for any civil damage which will result from the person's act or omission.

This statement simply explains these laws and states that if you provide first aid without any cost and act responsibly to save life of victim, you are a 'Good Samaritan' and will not have trouble from law.

Many a times, it is seen that an injured person is lying on the road and passersby just watch and do not intervene to stay safe from being called the culprits themselves. Therefore, a law or legal support is required to safeguard the first aid provider and this is possible through Good Samaritan Laws which have been enacted in India for someone who helps others in need.

Good Samaritan Guidelines in India

The guidelines in India were approved by Supreme Court on 30th March 2016, issued by central government for the protection of Good Samaritan at the hands of police or any other authority. These are as follows :

- 1) Good Samaritan to be treated with respect and without any discrimination on the grounds of gender, nationality, religion and caste.
- 2) Any individual except an eye witness, who calls the police to inform them of an accidental injury or death need not tell his or her personal details such as full name, address and phone number.
- 3) Police will not force the Good Samaritan to tell his/her name, identity, address and other such details to fill in the police record form or log register.
- 4) Police will not force the Good Samaritan to give information or any other details that he/she doesn't wish to share.
- 5) Police will allow the Good Samaritan to leave after having provided the information available to him/her and no further questions will be asked from him/her if he/she does not want to be the witness.
- 6) If a Good Samaritan chooses to be witness, he/she will be examined with care and respect.
- 7) The examination will be conducted at a time and place of the Good Samaritan's convenience and the investigation officer will be dressed in plain clothes.
- 8) If the Good Samaritan is required by the investigation officer to visit the police station, the reasons for the requirement shall be recorded by the officer in writing.
- 9) In a police station, the Good Samaritan will be examined in single examination in a reasonable and time-bound manner, without causing any delay.
- 10) If a Good Samaritan declares himself/herself to be an eye witness, he/she will be allowed to give evidence in the form of an affidavit.
- 11) Police is responsible to ensure that all above mentioned procedures are followed throughout their respective jurisdictions.

Rules to be kept in mind for Good Samaritan Law

For the successful use of these laws and safeguarding oneself, the following points should be kept in mind:

- That you, as a first aid provider gave the first aid as a result of or after the emergency.
- The initial injury or illness was not caused by the Good Samaritan but was due to some other reason.
- The first aid was not given in negligent and reckless manner and caused no harm to the victim.

Thus, Good Samaritan law removes the fear of bystanders to attend an injured person or an ill person for fear of being sued or taken to court.

1.4.2 Legal Issues

After studying the Good Samaritan Laws, it is also important to understand the legal issues that are involved while giving first aid and what are the legal issues to be considered.

Meaning

Legal Issues have to be kept in mind when helping a victim and providing first aid. It is important to understand that the legal aspects need to be considered to safeguard yourself as a first aid provider in front of law. One needs to be responsible, take approval from the victim so that he/she accepts your care and you must take care to avoid any mistakes when giving first aid.

Main Legal Considerations in First Aid

These are as follows:

1) Duty of care:

Duty of care is the duty of first aid provider to give first aid to the victim in a reasonable and in a responsible way. The first aid should be provided to the best of one's ability.

2) Negligence:

A first aid provider is not considered a professional in most cases. But in case any harm occurs to the victim, the court would look at the first aid provider's training and compare the actions with that of a reasonable person (trained first aider) in the same circumstances. So, the first aid provider has to be careful in providing care and avoid improper or irresponsible care i.e. first aid.

We will clarify the meaning of negligence by an example:

Example — If a first aid provider gives cardiopulmonary resuscitation (CPR) (Discussed in Unit 3 of Block 2 of Theory Course of this programme) and a rib is broken during the process of CPR. Resuscitation is successful and the person survives but the person who survives decides to appeal against the first aid provider because of rib injury during CPR. The Court would look for following facts:

- Was it reasonable to break the rib of victim while doing CPR to save the life ?
- Did the first aid provider act with care and skill?
- Was the first aid provider negligent in providing CPR ?
- Victim would have died if CPR had not been given irrespective of the rib injury?

If found clear, the first aid provider is set free. However, the best option is to provide first aid with utmost care and skill.

3) Consent

Consent means taking permission for doing something. It is important to take the permission of the victim before giving first aid. The consent is important since many victims can refuse your first aid and their decision needs to be respected. The following should be considered:

- Ask for and receive the consent of the victim for treatment if conscious.
- Consent of the victim is only for giving first aid for the condition which has effected his/her immediate health.
- First aid provider should not provide help beyond his or her knowledge or skill.
- In case the victim is unconscious, he/she can't give consent, so the consent is suggested / implied and hence, the first aid measures can be started without direct verbal expression or reaction of the victim.
- In case of child, consent can be obtained from the care giver. If caregiver is also injured or unconscious, then consent is implied and direct permission from the victim is not required to start the first aid just as discussed in above case.

4) Recording

A first aid provider should always make note and fill out a report for any minor or major event attended.

Records may be used in court/hospital, therefore legible, accurate, factual information should be recorded based on observation rather than opinions.

1.4.3 Ethical Issues

Let us now discuss the ethical issues to be considered while providing first aid.

Meaning

Various ethical issues are involved in first aid. First aid provider is a human being himself and has views of his own regarding many issues. It is important to note that the ethics are the moral principles which guide the person in decisions and hence, these decisions can influence the care provided.

Main Ethical Considerations in First Aid

The ethical considerations are important. These include:

1) Cultural sensitivity

First aid provider must respect the culture of all human beings and provide care taking into account the values and beliefs of the victim. Sometimes people may refuse some first aid procedures as per their cultural beliefs and first aid provider should respect the cultural ideals of the victims.

2) First aid in Children and Old

It is also an important consideration. It is important to be caring and sympathetic with children. Also for old age victims, it is important to be respectful and dignified.

3) Dealing with ones safety and also giving first aid

There are certain conditions where the first aid provider may encounter the risk to one's own safety and life and also feel the duty to provide care. In such situations, it is important to realize that the first aid provider must not attempt first aid where safety to his own life is threatened e.g. in cases like drowning and bites/stings. Then, it is important to deal with such situations keeping in mind the principles of first aid.

4) Refusal for first aid

Sometimes the victim may refuse your help as you are a stranger to him/her. In this situation, whether to give first aid or not is again an important decision. So, you should be understanding of the victim, accept his decisions and take his/her permission before giving first aid. Also you should maintain distance till the permission is given by the victim and if even after many requests the person does-not allow you to provide first aid, you should immediately transport the victim to the nearest medical facility or transport by calling the ambulance or calling for help (Discussed in Next Block).

5) Fear of attending the victim

The fear of attending the victim may arise when there are many victims or many injuries to the same victim. Many a times, in massive road traffic accidents, the victim is so badly injured that you may lack confidence in managing him or may become scared even on seeing him. Many a times you may want others to help but they also run away seeing the victims condition. Hence, one has to be considerate about these issues.

1.4.4 Emotional Issues

This section discusses the emotional aspects to be kept in mind while providing first aid.

Meaning

We all know that every person is different and can react differently based on one's personality and attitude. When giving first aid, the emotional level of the first aid provider has an influence on the care provided. In emergency, the first aid provider must be ready to support a person who needs first aid after a tragedy or any incident. The first aid provider needs to consider his own emotions as well as the emotions of the victim and the victim's family or the on-lookers who are there at the time of the emergency. Thus, it is important to be non-judgmental and balanced while providing first aid. It is also important to develop a good relationship with the victim and his family members so that they accept your first aid care and help you in the process of first aid.

Main Emotional Considerations in First Aid

There are few basic emotional issues the first aid provider must consider and develop and use when providing first aid. These are:

- Family members need immediate emotional support if they are around.
- Establish human connection in a compassionate manner.
- Empathize with the victim.
- Reassure him/her to remove the fear.
- Provide physical and emotional comfort.
- Help the victim (if conscious) to express immediate needs and concerns.
- Offer assistance and information to help survivors to express their needs and concerns.
- Connect the survivor to family members, friends, neighbours etc. through social networking or phone, if possible.

Providing first aid can be stressful, so you as a first aid provider must remain calm in all situations. There are times when you can't control the situation, there may be victims or their family members who are non cooperative and the person may not survive even after your best efforts but it is important to do your duty as a first aid provider.

Thus, in this section we discussed the main considerations to be kept in mind by the first aid provider while providing first aid.

Check Your Progress 2

- 1) Define Good Samaritan Laws.

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- 2) List the main legal considerations related to first aid.

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1.5 FIRST AID BOX

The first aid box is an important item for use in first aid and for first aid provider. Let us discuss this in detail.

1.5.1 Definition and Purposes

Definition

A small box or bag with the things that one would need to treat someone if they are injured or suddenly become ill i.e. during emergency is the First Aid Box (Fig. 1.3).

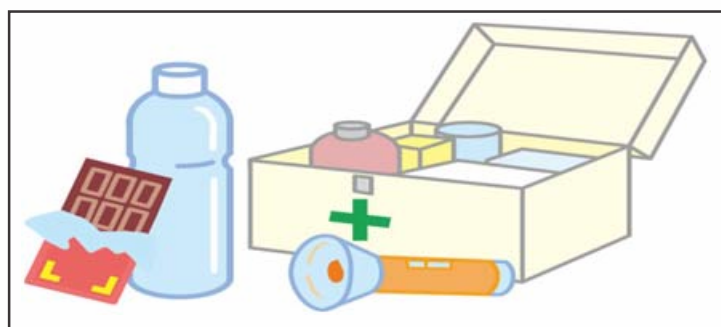


Fig. 1.3: First Aid Box

Availability of First Aid box

First aid box should be available at homes, schools/college, factories, buses, cars etc. and should be readily available, updated from time to time.

Important Points to remember while using First Aid Box:

- **Contents of first aid box depend on the situation and needs of the situation.**
- **Material needs to be checked and replaced at intervals.**
- **Keep at safe place, away from the reach of the children.**
- **First aid Box should not be turned to a medicine box for multiple uses. The use should only be for first aid.**
- **The procedure for use and maintenance of first aid box has been discussed in Unit 5 of Block 1 of Practical Course of this Programme.**

Purposes

- Provide basic supplies to do first aid
- Attend to person during emergencies using the supplies of first aid.

1.5.2 Basic Items in First Aid Box

The following Table 1.1 provides the information on the basic items in a first aid box with their purposes.

Table 1.1: Items in First Aid Box

Sl.	Items	Purpose
1	A packet of Gauze pieces	To act as dressing to cover the wound/ injury
2.	Bandages – Triangular or Roller of different sizes	To cover up the dressing on a wound/ injury and maintain the dressing in place
3.	Cotton wool	Can be used in place of gauze pieces
4.	Band Aids of Various sizes and shapes	To cover small wound/ injury
5.	Adhesive plaster	To paste the dressing in place
6.	Eye pads	To cover up the eyes if injured
7.	A scissor with both sides sharp	To cut dressing/gauze pieces/bandage/ adhesive etc.
8.	Antiseptic lotion i.e. Dettol or savlon/spirit/Antiseptic ointments	For use on the wound to kill the germs
9.	Analgesic Tablets like Paracetamol, Disprin	Given for pain/fever
10.	Two or three crepe bandages (various sizes)	For sprain/strains
11.	One small forcep/Tweezer	To pull out any foreign body or pick up any stuff
12.	Face mask/Packet of gloves/ apron/eye shield	To wear for avoiding cross infection
13.	Safety pins	For tying if knot can't be made

14.	One set of first aid wooden splints (various sizes) well-padded with cotton rolls	To support the fracture part under bandaging
15.	One small torch	To provide light on the wound/injury for a better look
16.	Note Book/Documentation forms + pen	To record about the first aid box/ first aid given in emergency incidents
17.	Rubber sheet/Plastic sheet	Used if required during first aid procedures
18.	Glucose/Lump of sugar	To be used as per situation
19.	Graduated medication glass	To measure lotion/ any solution etc.
20.	Thermometer	For recording temperature
21.	Hot pack like Rubber Hot water bottle	To provide heat therapy. May be present in bag or available separately
22.	Ice pack	To provide cold therapy. May be present in bag or available separately
23.	Volini spray/Moov cream	Application on sprains or muscle pains
24.	Binder/Tourniquet	To control bleeding

In addition to this compressed towel, emergency blanket & an emergency telephone list can be placed.

It is important to mention here , that you may not get all the required items as per the first aid box or many a times you may not even have a first aid box when you wish to give the first aid. So, you need to improvise i.e. use clean cloth in place of dressings, chunni in place of bandage and so on. You will learn more about the making and use of First Aid Box in Practical Course 1 Block 1, Unit 5, and about improvisation you will learn more in Practical Unit 6 of the same course and Block which you can refer for further information.

1.6 LET US SUM UP

Thus, in this unit we learnt about first aid, purposes of first aid, responsibilities and qualities of good first aid provider. We have also focussed on Good Samaritan Laws, Ethical and legal considerations and emotional aspects. We also emphasized on basic items in first aid box. Hope you shall appreciate the role and responsibilities of first aid and your role as a first aid provider.

But in order to become a good first aid provider, you need to acquire the knowledge about human body and what are the systems in body to develop a deep understanding about problems that effect the body and its organs. Moreover, the knowledge about body organ systems shall help you to understand various first aid techniques and procedures and guide your actions in first aid. Hence in the next unit ,we shall discuss about our body and organ systems.

1.7 KEY WORDS

Emergency : Serious/dangerous situation

Affect	: Effect or impact or result
Strangers	: One who is unknown to us
Professional help	: Medical help by doctors/paramedical staff/ nurses, a professional assistance
Injury /wound	: Getting hurt/being harmed
Complication	: Condition arising due to injury/disease
Face	: Deal with situation, encounter
Undertaken	: Handle
Victim/casualty	: A person harmed as a result of accident/injury
Survivor	: Person continuing to live or exist in spite of accident or ordeal
Immediate	: Instantly, promptly
Attention	: Observe with concentration
Suited	: Right for a particular situation
Medical Institution	: Hospital/Doctors Clinic
Preserve	: Maintain in normal state
Prevent	: Stop
Mishap	: Accident
Nervous	: Panicky, Anxious
Onlookers	: Person who observes an accident/incident
Good Samaritan	: A kind or helpful person
Ethics	: Set of moral principles that govern a person's behaviour
Legal	: Acceptable norms
Hazardous Circumstances	: Dangerous Conditions
Safe practices	: Procedures for maintaining safety
Aspects	: Features
Incompetent	: Not having skill for the task
Safeguard	: Protect
Guilty	: Feeling responsible for a wrongdoing
Legally protected	: Being safe in front of law
Civil damage	: Compensation given to the affected person by the guilty
Intervene	: Come in between to change the result
Culprits	: Person responsible for a misdeed or mishappening
Enact	: Make and use a law
Discrimination	: Unjust treatment on basis of race or Gender or cultural background

Examine/investigation	: Look into or do formal inquiry
Affidavit	: Written statement for court purposes
Implement	: Put to use/practice
Jurisdiction	: Power to take legal decisions
Reckless	: Not responsible
Sue	: Legally appeal against someone/something
Decision	: A conclusion or resolution
Negligent	: Failing to take proper care of something
Refuse	: Show that you don't want to do something
Accept	: Consent to receive/do something
Reasonable	: Being fair and sensible
Implied	: Suggested as not directly expressed
Principles	: Fundamental concept/idea
Empathize	: Understand others problems as of oneself and support them like you want to be supported whenever you face such situation.

1.8 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

- 1) First aid is care given to a victim immediately in a situation where a victim has met an accident, a fall or any other problem requiring immediate action. First aid provider is any person (need not be a doctor or nurse) who has been taught first aid and provides immediate treatment to the victim at the time of accident or any other mishap where medical help is required.
- 2) The scope of first aid is:
 - To find out the nature of situation and the condition of casualty who needs attention.
 - Applying first aid most suited to the situation and as per requirement until medical aid arrives.
 - Shifting the victim to a suitable hospital or medical institution.
 - To use first aid in various situations that may occur on road, street, home, factories, workshops, floods, earthquakes, drought, landslides and so on.
- 3) The five qualities of First Aid provider are:
 - Observant
 - Tactful
 - Good Judgement
 - Leadership skills
 - Caring

Check Your Progress 2

- 1) A person in good faith provides emergency care (without any payment or expectation of payment) at the site of an accident or emergency and shall not be liable for any civil damage which will result from the person's act or omission.
- 2) Main legal considerations relating to first aid are:-
 - Duty of care
 - Negligence
 - Consent
 - Recording

1.9 REFERENCES AND FURTHER READINGS

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8. <http://www.vitalfirstaid.com.au/f.ashx/Vital-First-Aid-First-Aid-Book-2015.pdf>.

List of Important Emergency Numbers

S.No.	Department	Contact
1	Single Emergency Number	112
2	Police	100/126/103/1095
4	Fire	101
5	Ambulance/ Centralised Accident & Trauma Services (CATS) (New Delhi)	102/1066/1099
6	Citizen Helpline (used for traffic accidents or terrorist attack or any emergency)	103/1090
7	Blood Requirement	104
8	Red Cross/Health problems related	105
9	Mental Problems Hotline	106
10	Disaster Management/Medical Helpline	108
11	Women's Helpline (for Delhi)	181/1092
12	Delhi and NCR help line service, Govt. of NCT of Delhi	1031
13	Emergency Relief Centre on National Highways	1033
14	Emergency Medical Services in Local area	1056
15	Anti Poison(New Delhi/all over)	1066/1054 respectively
16	Air Accident	1071
17	Train Accident	1072
18	Road Accident/Traffic Help Line	1073
19	Information on Pollution	1074
20	Disaster Management of Govt. of NCT (New Delhi)	1077
21	Disaster Management (all over)	1078
22	Blood Bank	1910
23	Child Abuse Hotline	1098
24	Air Ambulance	+91 9540161344
25	Senior Citizen Helpline (New Delhi)	1291/1091
26	Gas Leakage/Natural Disaster Control Room	1906
27	Earth-quake Helpline Service	1092

List of Important Helpline and Telephone Numbers

S.No.	Department	Contact
1	Anti-Obscene Calls Cell (New Delhi)/ Anti-Stalking Cell (New Delhi)	1096, 27894455 and 9911135446
2	Chief Ministers Helpline	1076
3	Eye Donation (New Delhi)	1919
4	Eye Bank in local area	1053
5	AIIMS (for donation of organs)	1060
6	PGI Chandigarh	1061
7	Traffic Police Helpline (New Delhi)	1095
8	Delhi Police Helpline (New Delhi)	1090
9	Helpline of NDMC Control Room (New Delhi)	1267
10	Ambulance Service (New Delhi)	1066
11	Tourist Helpline	1363
12	Comprehensive Trauma Consortium, Bangalore	1062
13	Asian Institute of Medical Science, Faridabad	1067
14	Medanta, The Medicity, Gurgaon	1068
15	Disaster Management Cell	022-2269 4725
16	National Health Helpline	1800-180-1104
17	Dial a Cab	1365
18	CGHS Helpline	155224
19	Mental Health Crisis (Depression/suicidal) Parivartan India	(044)-2754 6669
20	Central Relief Commissioner for Natural Calamities of Central/State/Union Territory	1070
21	Organ Retrieval	1055
22	HIV/AIDS helpline	1097
23	All India Railway	182/1512
24	AIIMS Blood Bank Helpline	011-26569461
25	Indian Red Cross Society Blood Bank	011-23711551
26	AIIMS	011-26864851
27	AIIMS Trauma Center	011-65900669
28	Safdarjung Hospital	011-26194690
29	Moolchand Hospital	011-42000000

30	LNJP, Delhi Gate	011-23233400
31	Sir Ganga Ram Hospital, Pusa Road	011-25712389
32	AIIMS Bhubaneshwar	(0674) 2476789
33	AIIMS, Bhopal	0291-2740742
34	AIIMS, Patna	0612-2451070
35	National Burns Centre, Mumbai	+91-22-2779 3333, +91-22-2779 6660/ 61 / 62 / 63
36	BLK Hospital (Burns)	+91-11-30403040
37	Burn & Trauma Research Center (BTRC), Noida	+91 96500 69488, +918826137605

Note: Many of the helpline and telephone numbers are also state specific. These numbers can be obtained from the local directory and website of state government as per your state/city. The same can be updated in the vacant page below for your reference.



UNIT 2 UNDERSTANDING HUMAN BODY

Structure

- 2.0 Introduction
- 2.1 Objectives
- 2.2 The Human Body
- 2.3 Surface Anatomy of the Human Body
- 2.4 Head to Toe Anatomy of the Human Body
- 2.5 Health and Illness
- 2.6 Let Us Sum Up
- 2.7 Key Words
- 2.8 Answers to Check Your Progress
- 2.9 References and Further Readings

2.0 INTRODUCTION

This unit deals with our human body and its complete structure. In the previous unit, you learnt about the concept of first aid and the first aid box. However, in order to move further in increasing our understanding in giving first aid, one needs to have knowledge about human body. Once you have the idea about human body, you will be able to manage the person who requires first aid and undertake procedures like CPR and so on. You can preserve life till help arrives and also you can assist the medical team in saving life.

This unit will be useful to make you confident in understanding the various organs of the body and its functioning, to know how the body works and what can happen if problems arise. Also, you will be able to appraise the vital signs of a person and fully understand his condition and complications that can arise for further necessary action. Hence, let us begin the discussion to develop the understanding about our human body.

2.1 OBJECTIVES

After the completion of this unit, you shall be able to :

- recognize the structure of human body;
- describe the surface anatomy of human body;
- discuss the various human body systems and their functions; and
- explain the concepts of health and illness.

2.2 THE HUMAN BODY

Human beings are complex in structure. The human body is a single structure but it is made up of billions of smaller structures. The smallest structure is the **cell** which is the simplest unit which can maintain life and reproduce itself. When many cells come together they form a **tissue**, which are more complex units than

cells. A tissue is an organization of many same cells. When many tissues come together they form the **Organs** which are more complex units than tissues. An organ consists of several different kinds of tissues arranged together that can perform a special function. When many organs come together to perform complex function of body in contact with one another, they form the **Organ System**. Thus, **the human body or organism** is made up of many systems working together. Fig. 2.1 represents this very clearly.

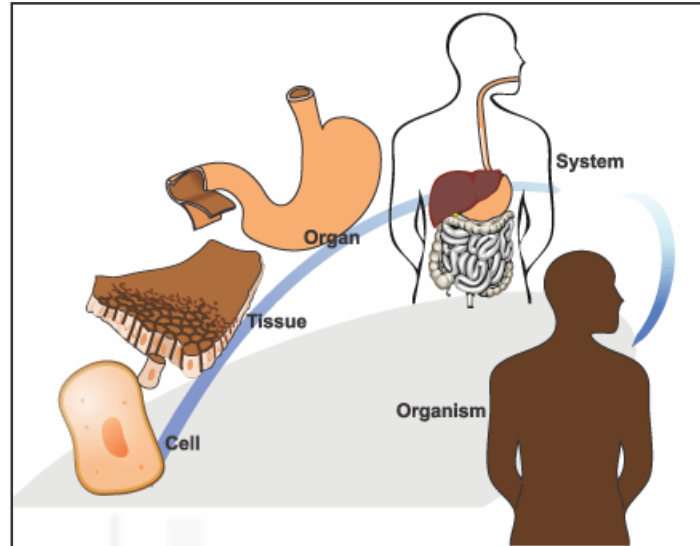


Fig. 2.1 : Cells to Organism level

Hence, we can conclude that the human body consists of various cells, tissues and organs working hand in hand. They perform their specific functions within the body. This maintains the function and health of the human being. Now, let us study the human body on the outside and the inside. We shall discuss the human body externally and internally. So, let us begin.

2.3 SURFACE ANATOMY OF THE HUMAN BODY

Anatomy is the study of structures. When we talk about human body , surface anatomy is the study of external features of the human body. As shown in Fig. 2.2, we are already very much familiar with many of the parts of human body that we are able to see . Lets discuss them one by one.

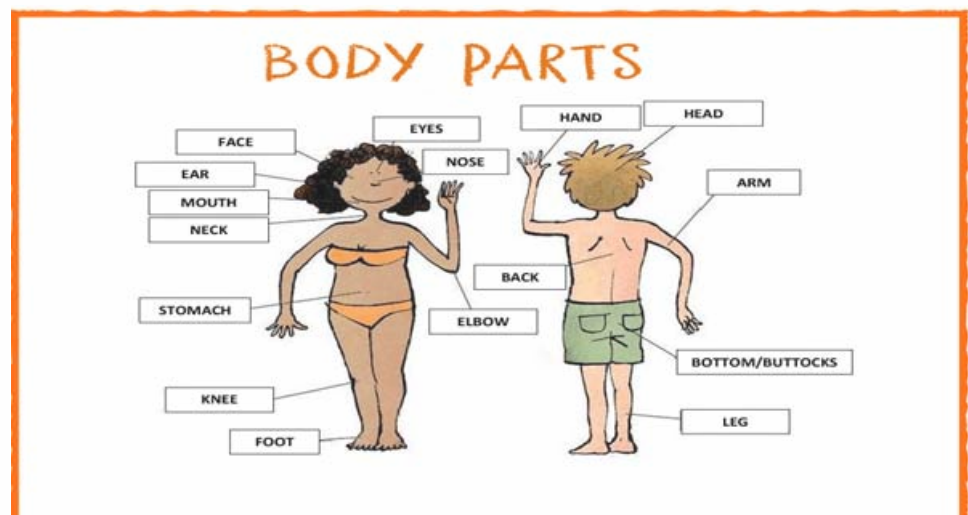


Fig. 2.2: Parts of Body

The main parts of body as seen externally are as follows:

A) Head and face

The **Head** is the upper most part of the body. It has hair which covers the head. The head has brain inside it which is the ‘thinking machine’ of the body. **Forehead** is the part which covers the head from front above the eyes.

The **Face** is the first part seen from the outside. The important parts seen on the face are:

- a) **Eyes-** They help to see things. The important structures associated with Eyes are:
 - i) **Eye lids:** The eyes are covered by eye lids. The eye-lid present on the upper part is upper eyelid and the one on the lower side is called the lower eye-lid.
 - ii) **Eye lashes:** Eye lids have eye lashes. Both eyelids and eyelashes protect the eye against dust or other foreign bodies that can enter the eye.
 - iii) **Eye brows:** There is also the presence of eye brows which protect against sunlight and against other causes that may damage the eye.
- b) **Ear-** You can hear by the help of your ear.
- c) **Nose** - You can smell with your nose. You can also breathe through your nose. The structures associated with nose are:
 - i) Tip of the nose is called **apex**.
 - ii) **Nostrils** - these are the two holes in your nose.
- d) **Mouth** - You use your mouth to talk, to eat and to breathe. The associated structures are:
 - i) **Lips:** These are present as upper and lower lips which cover the mouth.
 - ii) **Tongue:** There is presence of tongue at the bottom of your mouth that tastes things and helps you pronounce words.
 - iii) **Teeth** : They are useful in chewing the food.
- e) **Chin** -The face usually thins down to form the chin.
- f) **Neck** – Connects your head with your shoulders and the rest of your body.

Fig. 2.3 shows the various external features of head and face.

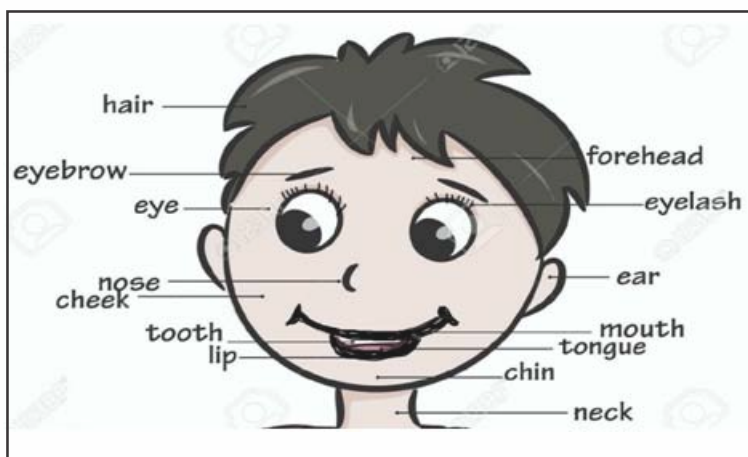


Fig. 2.3: Surface Anatomy: Head and Face

B) Trunk :

The trunk also called as torso is the second major part of body below the head. It consists of chest, abdomen and the back. Fig. 2.4 shows the various parts of trunk of human body.

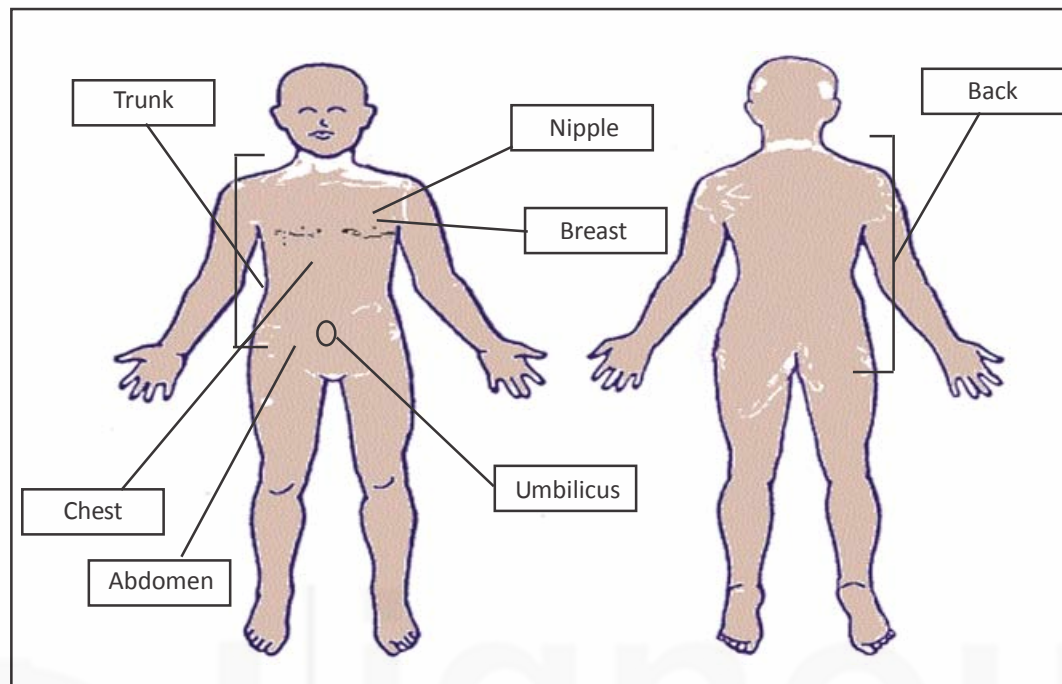


Fig. 2.4: Surface Anatomy: Human Trunk and Back

- 1) **Chest** also called as thorax and has heart inside which pumps blood around your body, lungs helping you breathe and big blood vessels which transport blood into and out of the heart. They are like little tubes. On the outside , there is presence of breast (with nipple).
- 2) **Abdomen** is the area below the chest. It has a belly button or umbilicus externally. Internally, it has liver – the organ that cleans your blood, stomach and intestines where the food goes and is absorbed and kidneys that process all body waste.
- 3) The **Back** is the back side of the trunk which has spinal cord on inside with vertebral column covering it.

C) Limbs:

The remaining parts are limbs. They are also called extremities as shown in Fig. 2.5. Upper limbs are arms and lower limbs are the legs.

- i) The **Arms and Hands** help in performing various tasks. They form the upper extremity. They are further divided into following parts:
 - Shoulder connects the arm to the body.
 - Arm consists of forearm- the upper part of arm and hind arm –the lower part of arm which are connected at the elbow joint.
 - The wrist joint connects hind arm to Hand. The hand consists of palm and five fingers in each hand.

- ii) **Leg and Foot** – The legs and feet form the lower limbs. These are joined to abdomen/trunk by groin. The legs are joined to groin by thigh which is joined to lower part of legs by knee joint. The leg is joined to feet by ankle joint. The calf muscles are present at the back side of the lower part of the knee joint.

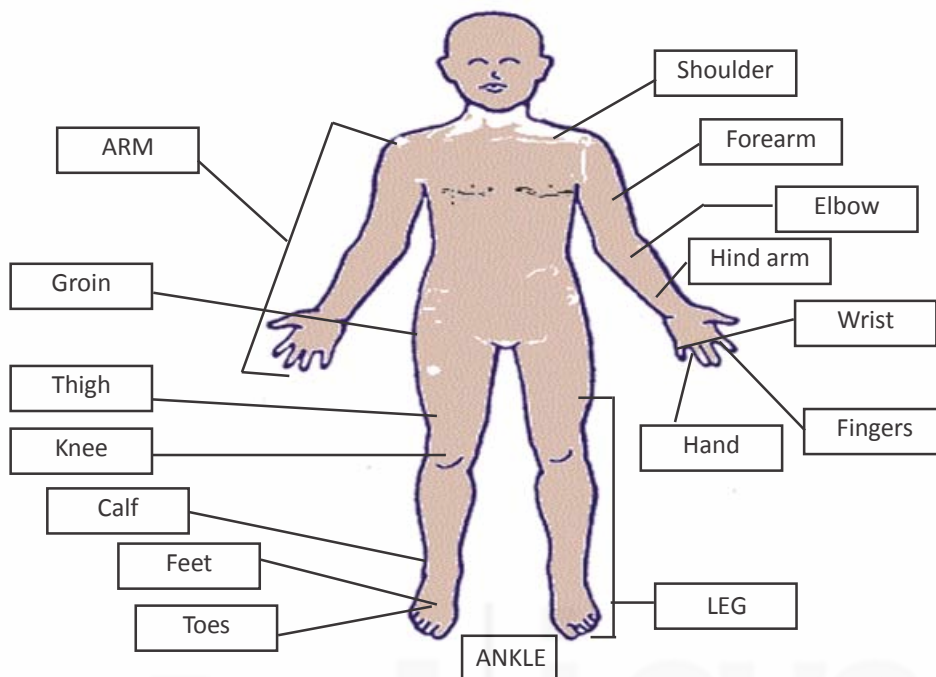


Fig. 2.5: Surface Anatomy: Upper and Lower Limbs

Thus, in this section we talked about Surface Anatomy of Human Body and its major features. In next section we will discuss the further details of Human Body.

Check Your Progress 1

- 1) Fill in the Blanks:
 - a) The other name for trunk of human body is
 - b) The upper part of the arm is also called.....
 - c) Eye lashes help to protect against
 - d) joint is present between leg and feet.
- 2) Match the Following to their respective parts of body:

Column A

- i) Umbilicus
- ii) Breast
- iii) Forehead
- iv) Groin

Column B

- a) Arm
- b) Abdomen
- c) Back
- d) Nipple
- e) Leg
- f) Head

2.4 HEAD TO TOE ANATOMY OF THE HUMAN BODY

The Human Body consists of various systems which is an organization of organs arranged together performing complex functions for the body. Fig. 2.6 represents

some of the body systems. The major systems of the body starting from Head to Toe are as follows:

- 1) Integumentary System
- 2) Nervous System
- 3) Cardiovascular System
- 4) Respiratory System
- 5) Digestive System
- 6) Urinary System
- 7) Reproductive System
- 8) Musculo-Skeletal System
- 9) Lymphatic System
- 10) Endocrine System
- 11) Sensory System

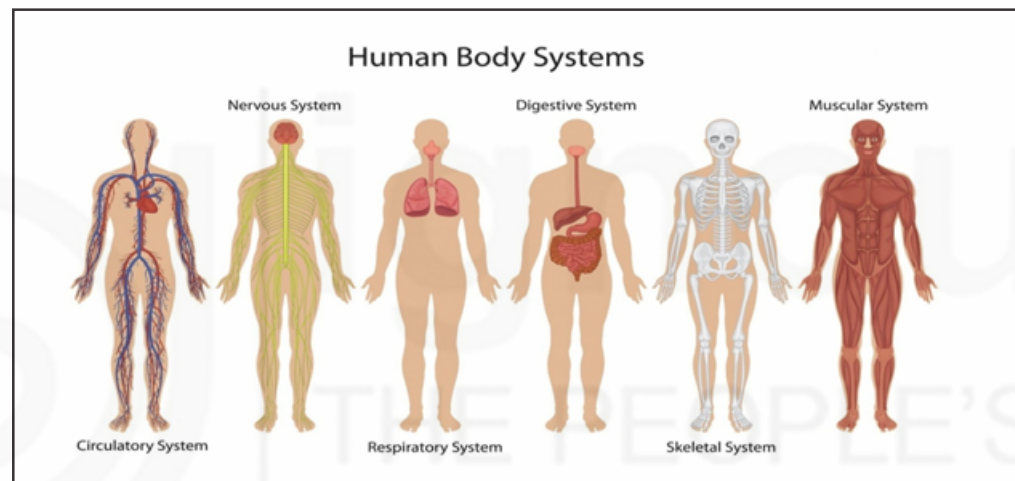


Fig. 2.6: Human Body systems

Now, let us discuss these systems one by one.

1) INTEGUMENTARY SYSTEM

The outermost cover of our body is the skin. The skin not only helps to protect the internal body structures but also acts as an organ of sensation by virtue of touch. In addition to skin, hair and nails are also the part of the Integumentary system.

Structure

The structure of Integumentary system is as follows:

1) Skin

Skin is the largest organ of the integumentary system and is also largest of all the organs in body. The skin consists of various layers (Fig. 2.7) which are as follows:

- **Epidermis** : It is the outermost layer and consists of plenty of cells.

- **Dermis:** It is the inner most layer and thicker. It has sweat glands , nerves, hair follicles which open on the surface. They have melanocytes which produce pigment melanin that gives skin its colour.
- **Subcutaneous fat** is below the dermis and is made of tissue with fatty substances.

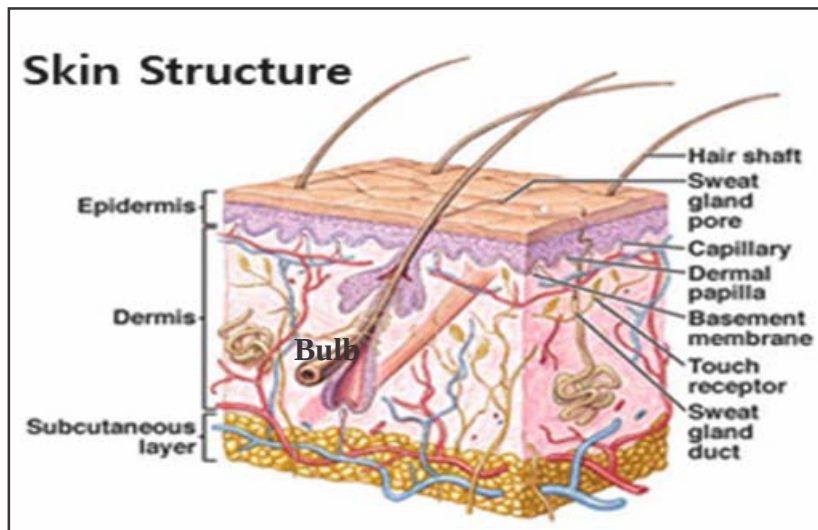


Fig. 2.7: Structure of Skin and Hair Follicles

2) Hair

These grow from the follicles, in the dermis of your skin as shown in Fig. 2.7. Hair is made from protein called keratin. The base of the Hair is called as bulb.

3) Nails

They cover the ends of fingers and toes in human beings (Fig. 2.8). They are hard. Lunula is the whitish area on the nail and at the base of this there is special epidermis called as cuticle.

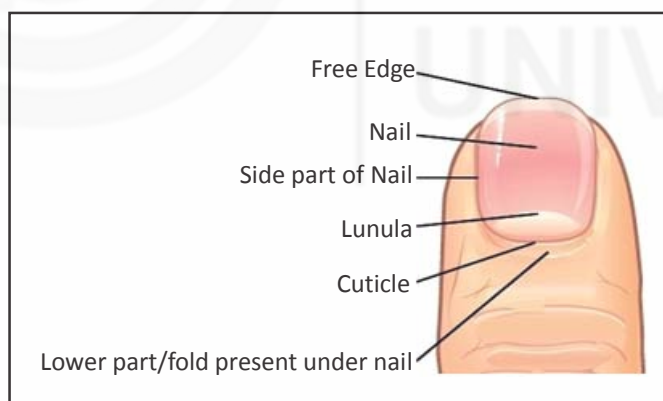


Fig. 2.8 : Structure of Nail

Functions

- Thick covering to protect our internal delicate organs, tissues, muscles and bones against microbes & hazardous elements.
- Regulation of body temperature and sensation of touch, pain, heat and cold.
- Provides a waterproof barrier.
- It contains Melanocytes producing melanin pigment which gives color to the skin.

Note:

The Skin and its layers are usually affected during wounds, injury, cuts, burns, accidents and so on. The more the involvement of the skin layers, the deep and the more fatal the injury can be.

2) NERVOUS SYSTEM

The nervous system controls our actions by sending signals to various parts of body. Let us discuss this in detail.

Structure

The parts of Nervous system are:

1) Brain

It is present in the skull. It is covered by membranes called meninges which protect it. It consists of the following parts:

- **Cerebrum or Forebrain** is upper part of brain. It is divided into right and left parts. It controls behaviour, thought, response, awareness, speech and language.
- **Midbrain** is middle part of brain which controls respiration and cardiovascular system.
- **Hindbrain or Cerebellum** is the lowermost part of brain and controls posture, muscle function and balance.

Figs. 2.9 and 2.10 show the structure of brain and spinal cord in our body.

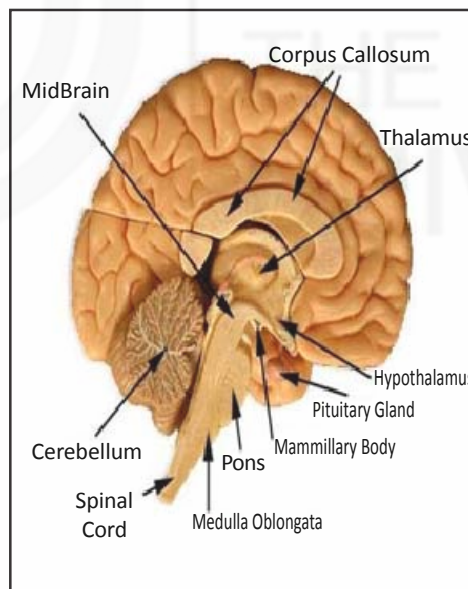


Fig. 2.9: Structure of Human Brain

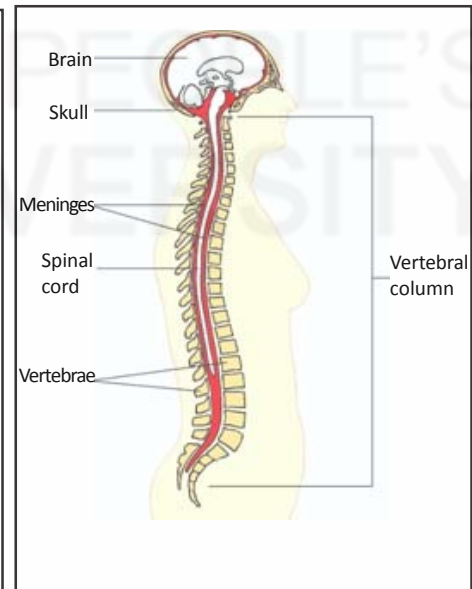


Fig. 2.10: Brain and Spinal Cord

- 2) **Spinal cord** begins at the midbrain and extends down to lumbar vertebrae of vertebral column as shown in Fig. 2.10. It has role in communication between brain and various parts of the body.
- 3) **Nerves** coming out from spinal cord and going through out the body which maintain various body functions (Fig. 2.11).

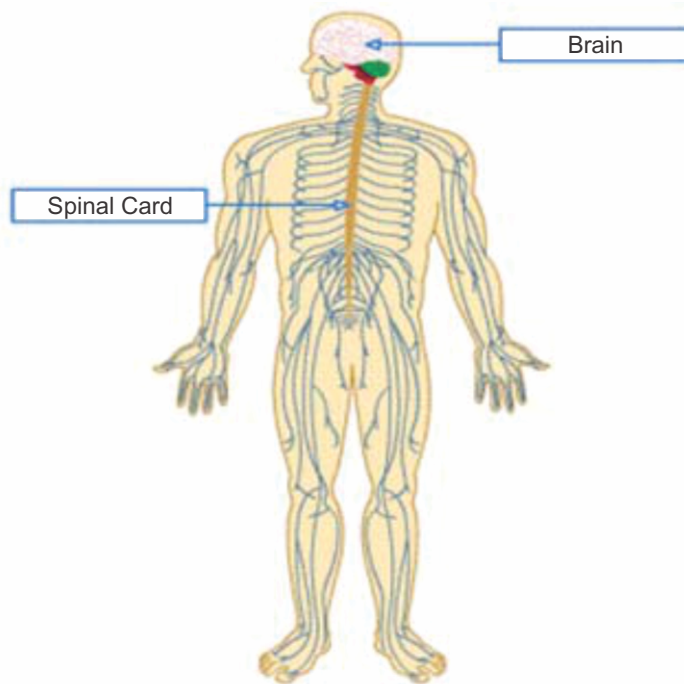


Fig. 2.11: System of Nerves in body

Functions

The main function of Nervous system is to control the various functions of body. The role of this system is to regulate all activities of the body and bring adjustments between the body and surroundings in order to maintain a state of balance.

Note:

The Brain and Spinal cord are affected during falls, head injury, wound, accidents, Skull and vertebral column fractures. Be careful when dealing with such injuries as reckless handling and unnecessary movement can increase chance of more injury and severely damage the spinal cord and brain.

The functioning of brain decreases during various emergencies and the person may report lack of response, confusion and decrease in other functions of the brain. So be alert when dealing with emergencies.

3) CARDIOVASCULAR/CIRCULATORY SYSTEM

The job of the cardiovascular/circulatory system is to move blood, nutrients, gases like oxygen and carbon dioxide around the body.

Structure

The cardiovascular system consists of following parts :

1) Heart

The heart is a muscular pumping organ in the center of chest between the two lungs. Fig. 2.12 shows the structure of heart. The bottom tip of the heart is called as apex and is turned to the left. The top of the heart is known as base. The heart connects to the great blood vessels of the body. The heart has four chambers called right and left atrium and right and left ventricles, separated from each other by a wall called as septum.

Due to electrical activity in the heart, there is contraction and relaxation movements of the muscles of the heart and hence, the pumping of blood to rest of the body occurs.

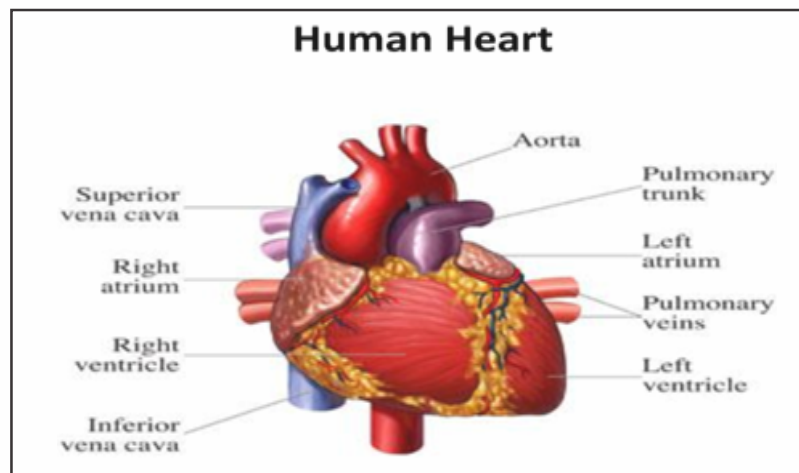


Fig. 2.12: Structure of Human Heart

In the heart, the right side has deoxygenated blood which reaches the heart by means of big veins called vena cava. Superior venacava brings blood from upper part and inferior venacava bringing blood from lower part of the body. This blood is pumped to lungs via pulmonary arteries where the oxygen is added to blood and carbon-di-oxide is removed from the blood. The blood then comes back to heart via pulmonary vein and is pumped to rest of the body via big artery called aorta. This pumping action leads to formation of **heart beat**. Fig. 2.13 represents this process of circulation of blood in the heart. The pressure with which the blood is pumped in aorta is **blood pressure**. It is 120/80 mm Hg . The heart beats and with every beat it pumps the blood into the body which can be felt at the bony portions as **pulse**. It is about 72/minute for a normal healthy person.

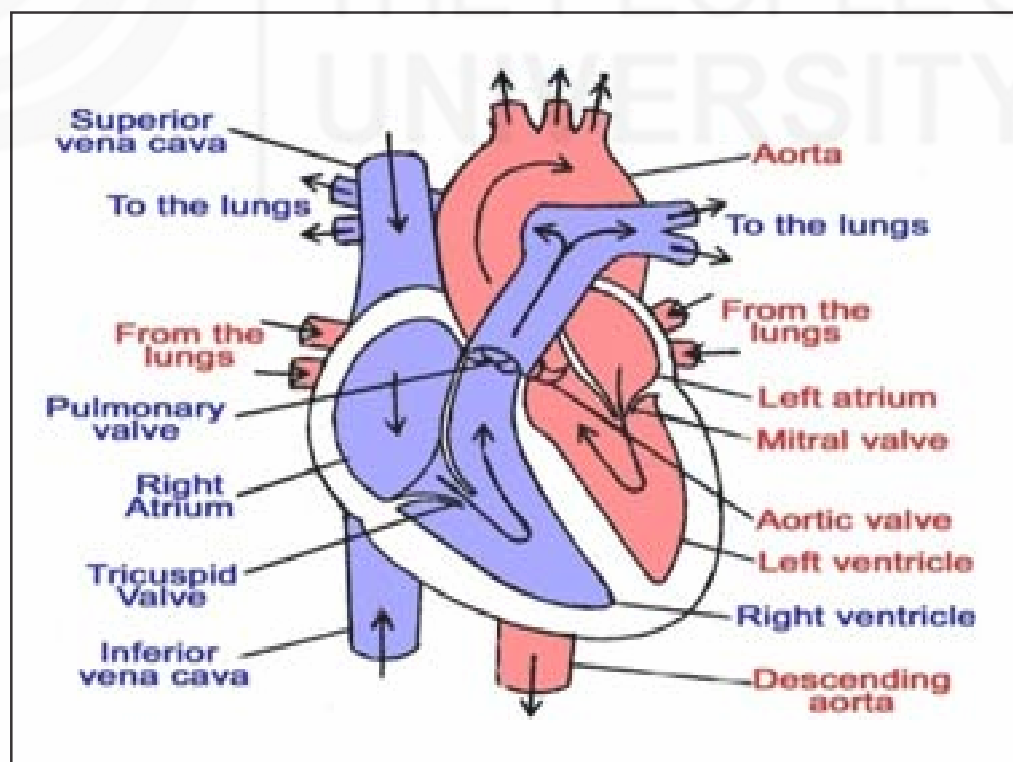


Fig. 2.13: Functioning of the heart to pump blood

2) Blood Vessels

The blood vessels are the highways that help the blood to flow quickly and efficiently from the heart to every region of the body.

There are three major types of blood vessels: arteries, capillaries and veins.

- **Arteries** carry oxygenated blood away from the heart into the body. Pulmonary arteries are exception as they carry deoxygenated blood from the heart to the lungs.
- **Capillaries** are the smallest and thinnest of the blood vessels which carry blood very close to the cells in order to exchange gases, nutrients, and waste products.
- **Veins** are the large return vessels of the body which carry deoxygenated blood. Pulmonary Veins are exception as they carry oxygenated blood towards heart.

Fig. 2.14 represents the connection of artery , vein and capillaries.

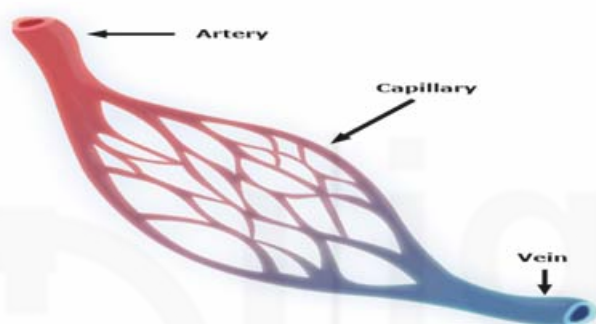


Fig. 2.14: Artery, Vein and Capillaries

Functions

The main function of heart is to pump the blood into the body and receive the blood from the body i.e. maintain circulation. The role of blood vessels is to carry and circulate the pure (oxygenated) and impure blood (de-oxygenated) in the body.

Note:

The heart has its own supply of oxygenated blood. Coronary arteries come out from aorta when aorta leaves the heart and supply the oxygenated blood to the heart. When any obstruction or clot or plaque develops in these arteries, the blood supply to heart is effected or cut off. In this condition, the person may complain of chest pain due to lack of oxygen to the heart muscles where these arteries may be supplying blood leading to Heart attack or other related conditions. In similar manner clot/bleeding/obstruction in any major artery/vein leads to various emergencies.

Check Your Progress 2

- 1) List the parts of Cardiovascular System in the Body.

.....

.....

.....

- 2) Tick if True or False.
 - a) The melanocytes are the part of epidermis. T/F
 - b) The hair on head are thick to protect against injury. T/F
 - c) Midbrain controls the language. T/F
 - d) Aorta is the largest artery of the body. T/F
 - e) Coronary arteries supply the blood to the heart. T/F
- 3) List any 3 functions of Nervous system.
 - 1)
 - 2)
 - 3)

4) RESPIRATORY SYSTEM

The respiratory system allows us to take in oxygen and give out carbon dioxide in a process we call breathing. It consists of trachea, diaphragm and lungs.

Structure

As shown in Fig. 2.15, the parts of Respiratory system are as follows:

1) Nose

This has already been discussed in this unit in section 2.3 on surface anatomy of human body. The nose is used to take in (inhale) air into the body which is warmed and filtered to remove dust, pollen, and other contaminants.

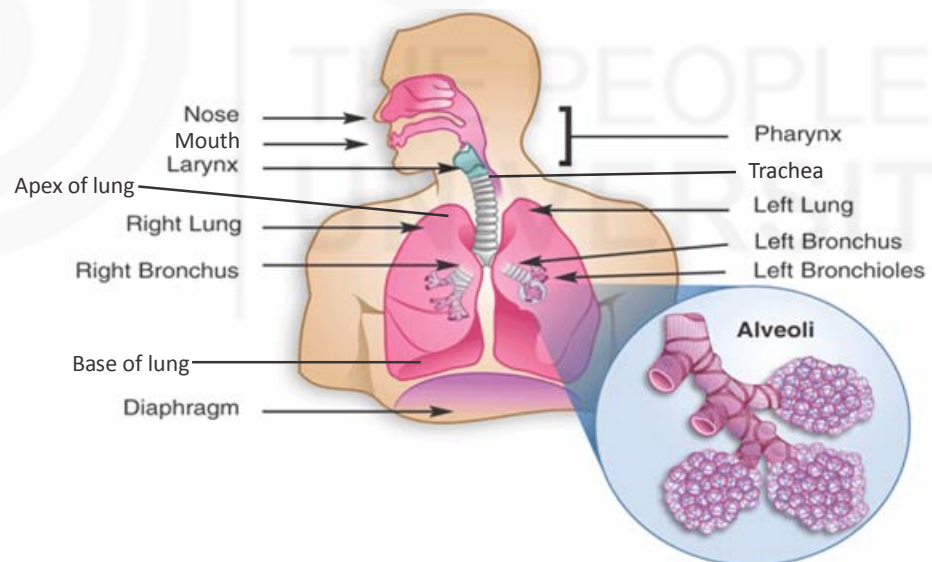


Fig. 2.15: Parts of Respiratory System

2) Mouth

Majority of respiration is achieved by the nose, but the mouth can be used if needed. This has also been discussed in section 2.3 of this unit.

3) Pharynx

It is also known as throat. It is a tube starting from the base of skull behind the nose, mouth and larynx (voice box) to the oesophagus (food pipe) and trachea (wind pipe). It helps in passing of food and air into the respective pipes.

4) Larynx

Also known as the voice box, it is the lowest part of pharynx and opens into trachea. It has a cover called epiglottis which acts as a guard to not allow any food to enter the wind pipe and prevent choking. Vocal chords are present helping in voice production.

5) Trachea and Bronchi

Trachea or windpipe begins from larynx and ends by dividing into left and right bronchi as seen in Fig. 2.15.

6) Lungs

The lungs, two in number, are main organs of respiration. They are present in the chest on each side as right and left lung separated in middle by the heart and big blood vessels. The rounded upper end of the lung is called apex and lower part is the base. They have air spaces called alveoli which help in exchange of gases in the blood.

7) Diaphragm

The diaphragm is an important muscle of respiration which is situated beneath the lungs.

Functions

The main function of the respiratory system is respiration and gaseous exchange. The air which is taken in through the nose by process of inspiration (inhaling or taking in air) reaches the lungs as lungs expand. Here, it comes into contact with the blood in the capillaries. Oxygen passes into the blood and goes to the heart from where it is pumped to all parts of body. The carbon dioxide which is the waste product is sent into the lungs where it mixes with waste gases and is breathed out through nose and mouth by process of expiration (exhaling or giving out air). The lungs contract as air is breathed out. Both inspiration and expiration together form the process of respiration. This movement of chest along with respiration if monitored per minute gives you the **respiratory rate** of the person. It is usually 18-20/minute for a normal healthy person. Fig. 2.16 shows the process of inspiration and expiration.

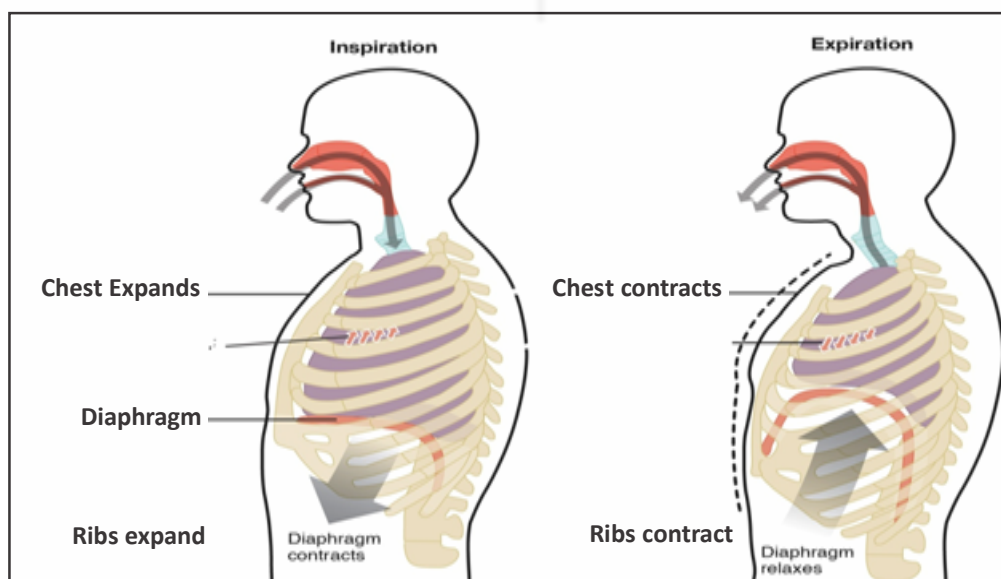


Fig. 2.16: Inspiration and Expiration

Note:

- **The respiratory rate is important sign showing the functioning of the respiratory system.(Discussed in Unit 2 of Practical Block 1 of this Programme)**
- **While giving first aid, ensure that the airway is clear and not blocked. Checking the mouth, nose and pharynx will show any blocking or not. This can also simply be tested by asking person to speak up his name. Airway should be clear or should be cleared if required.**
- **Foreign bodies, choking, injury to chest, chest wound, rib fracture and lung injuries are common emergencies which effect the respiratory system and require first aid.**

5) DIGESTIVE SYSTEM

The digestive system consists of organs that together, allow the body to break down and absorb food, and remove waste.

Structure

As shown in Fig. 2.17, the parts of digestive system are as follows:

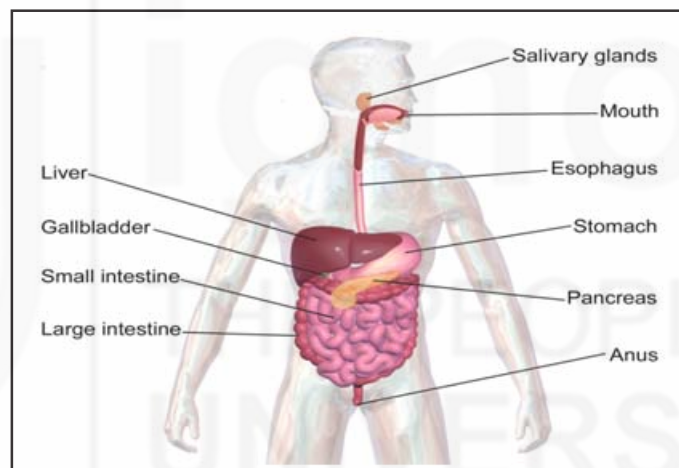


Fig. 2.17: Digestive System

1) Mouth

It is the beginning of the digestive tract. Food is chewed and saliva released by salivary glands present in mouth is mixed with food to help the nutrients to get absorbed.

2) Esophagus (Food Pipe)

It receives food from your mouth when you swallow which then goes to stomach.

3) Stomach

It breaks down food into a usable form. Cells in the lining of the stomach secrete acid and enzymes responsible for the breakdown process.

4) Small intestine

It is a long muscular tube that breaks down food coming from stomach using its own enzymes and enzymes coming from secretions of pancreas and liver. The nutrients are absorbed into the blood.

5) Large intestine (Colon)

It connects the small intestine to the rectum. It is responsible for processing waste /stool.

6) Rectum and Anus

These are the last parts of the digestive system. It is the rectum's job to receive stool from the large intestine or colon. Anus has muscles which work for controlling and releasing the stool.

7) Associated structures:

a) Pancreas

It secretes digestive enzymes into small intestine which break down protein, fats, and carbohydrates. The pancreas also makes insulin.

b) Liver

Bile from the liver secreted into the small intestine helps in digesting fat.

c) Gallbladder

The gallbladder stores and concentrates bile, and then releases it into the small intestine to help absorb and digest fats.

Functions

The digestive system helps in digesting food and releasing energy needed to survive and produces waste.

Note:

- Choking and foreign bodies are quite common emergencies encountered.
- Open wound with impaled or penetrated objects in abdomen like gun shot, knife, screw driver etc. should be stabilized and dressing applied with immediate transfer to hospital. (This is discussed in Unit 1 of Block 3 of Theory Course)

6) URINARY SYSTEM

The urinary system helps eliminate the waste product from the body in form of urea and ammonia by means of urine.

Structure

As shown in Fig. 2.18, the parts of Urinary system are as follows:

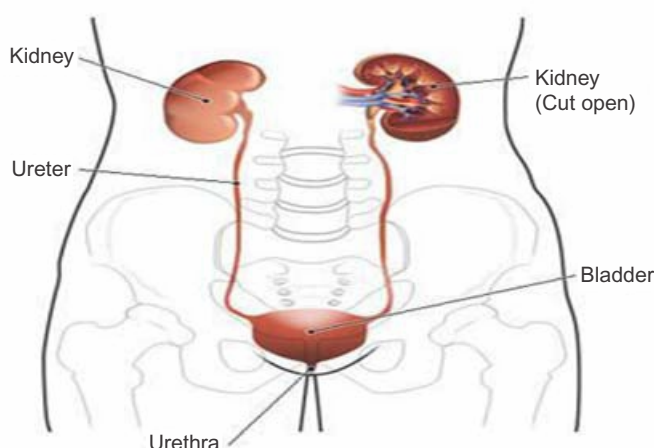


Fig. 2.18: Parts of Urinary System

1) Kidneys

Kidneys are a pair of bean-shaped organs present on both sides of spine below diaphragm. They filter and clean the blood of wastes and remove excess water as urine.

2) Ureter

Ureters are 2 tubes which carry the urine from kidneys to the urinary bladder.

3) Urinary Bladder

Urinary bladder receives the urine from kidneys and stores it. It is a muscular organ whose size keeps changing depending on the quantity of urine. It can store upto 600 ml of urine. When 300-400 ml of urine gets filled , the person has the urge to pass urine.

4) Urethra

Urethra is a canal that excretes urine out of the body. Urethra starts from bladder. The urethra is the last part of the urinary system where urine flows.

Functions

The kidneys regulate blood pressure, help in making vitamin D and produce hormone called erythropoietin which causes red blood cell formation. They secrete urine and maintain the pH of the blood. It helps in storing and release of urine.

7) REPRODUCTIVE SYSTEM

The reproductive system allows humans to reproduce. The male reproductive system includes the penis and the testes, which produce sperm. The female reproductive system consists of the vagina, the uterus and the ovaries, which produce eggs. During conception, a sperm cell fuses with an egg cell, which creates a fertilized egg that implants and grows in the uterus.

Male Reproductive Organs

As shown in Fig. 2.19, the parts of Male Reproductive system are as follows:

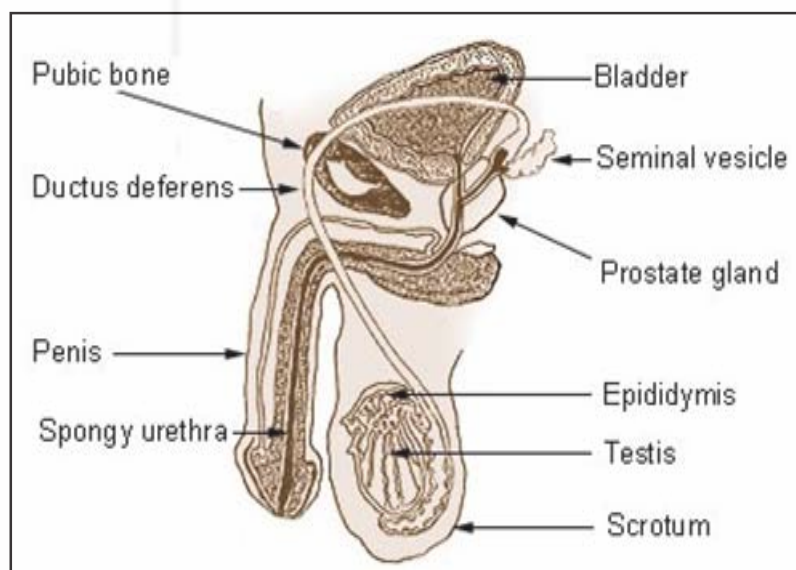


Fig. 2.19: Male Reproductive Organs

1) Penis

It has urethra which is 7-9 inches long. It starts from the bladder and passes through the perineum to the penis. It is the only external reproductive organ in male reproductive system.

2) Testes

Produce sperms and male sex hormone testosterone. They are present in pouch like structure called scrotum.

3) The seminal vesicles

Paired tubular glands situated behind the neck of the bladder. The seminal fluid secreted by seminal vesicle helps to keep the sperm alive.

The **prostate gland** lies below the bladder surrounding the urethra and is composed of glands, ducts and involuntary muscles.

Female Reproductive Organs

The female reproductive system consists of internal and external organs. There is also one accessory organ i.e. breast. We shall first discuss the external and then proceed to discuss the internal organs and accessory organs.

External structures of Female Reproductive tract

As shown in Fig. 2.20 , the parts of External Female Reproductive system are as follows:

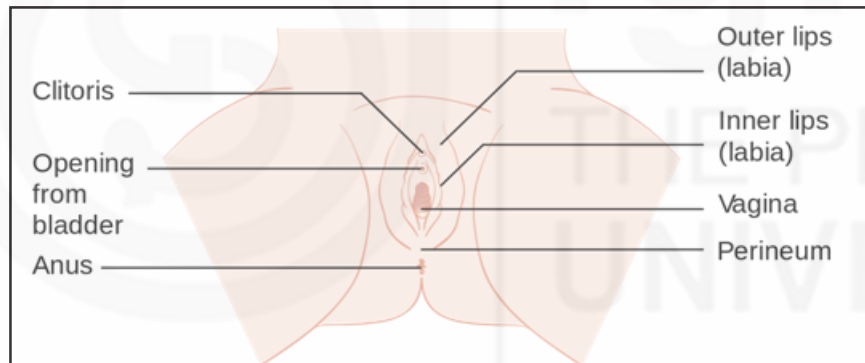


Fig. 2.20 : External Reproductive system

1) Labia Majora

These are the large outer lips and main purpose is to close and protect other external sexual organs.

2) Labia Minora

These are the small inner lips located inside the labia majora. These smaller labia are visible when the labia majora are separated.

3) Clitoris

This is a highly sensitive structure packed with nerve endings and its function is same as the head of a male's penis.

4) Vaginal Orifice

It is the opening of vagina (an internal reproductive organ which you will study later) on the outside and is seen as the external organ of reproductive system.

This external area is called as **vulva** and has the openings of urethra and vagina in it.

Internal structures of Female Reproductive tract

As shown in Fig. 2.21, the parts of Internal Female Reproductive system are as follows:

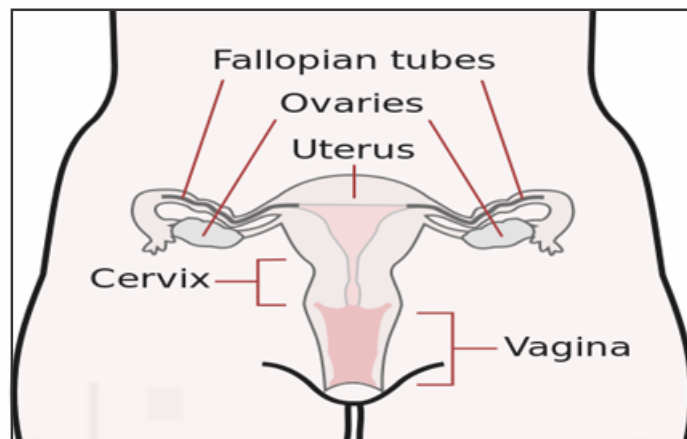


Fig. 2.21: Internal Reproductive system

1) Vagina

This is a canal or tube-like structure for delivery of baby. It connects uterus to external reproductive organs.

2) Cervix

It is found at the end of the vagina and is the opening of the uterus. It stretches and dilates at the time of birth to allow passage of the baby from the uterus to outside the body.

3) Uterus (womb)

A muscular organ that houses baby during pregnancy. During the menstrual period, the uterus sheds it's lining and produces vaginal bleeding.

4) Ovaries

There are two ovaries and one is located on each side of the uterus. They produce eggs and other hormones.

5) Fallopian tubes

These tubes connect the ovaries to uterus. They capture an egg after it is released by the ovary and guide it into the tube to reach the uterus.

Breasts are accessory to the female reproductive organs and secrete milk. The weight and the size of the breast varies and enlarges during adolescence at puberty (age between 12 to 19 years) and increases in size during pregnancy and after delivery.

The primary function of the reproductive system is to allow the creation of a pregnancy.

Check Your Progress 3

1) List two roles of respiratory system.

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2) List the various parts of Digestive System.

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3) Write five main functions of urinary system.

a)

b)

c)

d)

e)

8) MUSCULO-SKELETAL SYSTEM

Our bodies are supported by the skeletal system, which consists of 206 bones that are connected by tendons, ligaments and cartilage. The body's muscular system supports the skeletal system and both work in coordination to help us move.

We shall discuss skeletal system first and then, the Muscular System.

A) Skeletal System

The Skeletal System consists of bones and joints. Fig. 2.22 shows the skeletal system of the body.

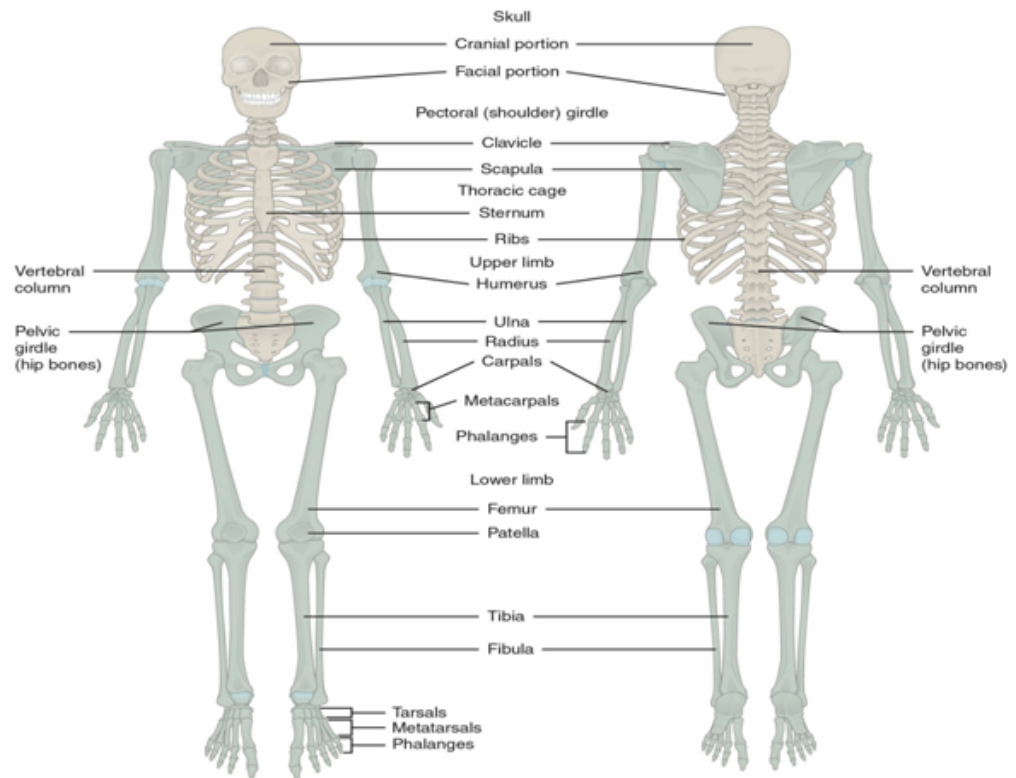


Fig. 2.22: Skeletal System of the body

Structure

The human body contains 206 bones. The main bones are as under:

Composition of skeletal system

Bones	Parts	Number of Bones
Cranium /Skull	Skull	8
	Face including jaws	14
	Bones of the ear	6
	Neck	1
	total	29
Spine /Backbone or Vertebral column	Cervical vertebrae (<i>C1 to C7</i>)	7
	Thoracic vertebrae (<i>Th1 to Th12</i>)	12
	Lumbar vertebrae (<i>L1 to L5</i>)	5
	Sacrum (<i>counted as 1 but ranges from 4-6</i>)	1
	Coccyx (<i>counted as 1 but ranges from 3-5</i>)	1
	total	26
Chest Bones shoulder girdle (collar bone or clavicle and shoulder blade or scapula)	Ribs	24
	Sternum or breast bone (<i>3 sections counted as 1</i>)	1
	Clavicle	2
	Scapula	2
	total	29
Upper extremity and hand	Humerus	2
	Radius	2
	Ulna	2
	Carpals	16
	Metacarpals	10
	Phalanges	28

	total	60
Lower extremity and pelvic girdle made of hip bone , thigh bone and lower leg bones	Hip bone	2
	Femur	2
	Patella	2
	Tibia	2
	Fibula	2
	Tarsals	14
	Metatarsals	10
	Phalanges	28
	total	62
	grand total	206

Types of bones

Examples

- a) Long bones - Upper arm (humerus), radius (thumb side of fore arm) and ulna (little finger side of fore arm), Upper legs (femur in upper portion of the leg).
- b) Short bones - Wrists and Ankles.
- c) Flat bones - Shoulder blades, Skull (head), Chest Bones (Sternum and Ribs)
- d) Irregular bones - Face and Vertebral column
- e) Sesamoid bone - Patella – Knee cap at knee joint

B) Muscular System

Muscles are composed of fibre. Muscles help to move the body. Fig. 2.23 shows the muscular system of the body.

Structure

There are three types of muscles:

- a) **Voluntary muscles:** With the help of these muscles the body can be flexed and extended.

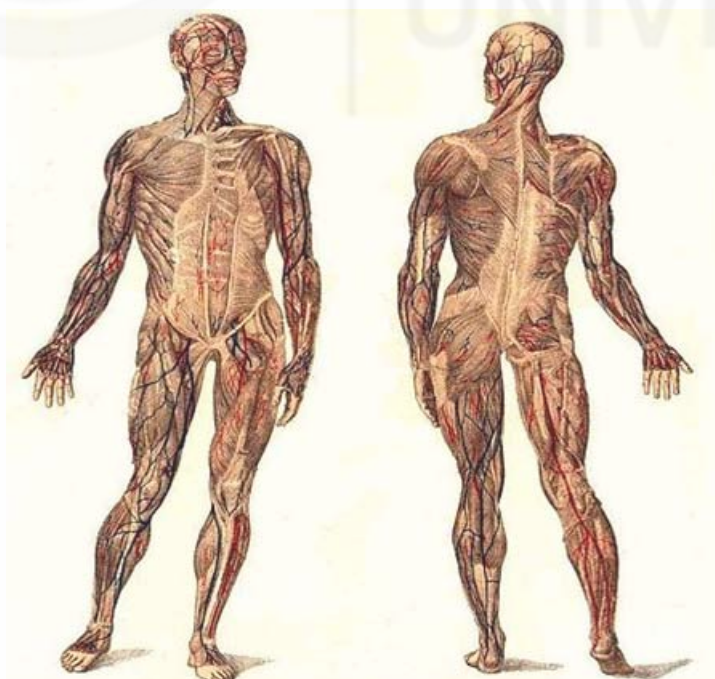


Fig. 2.23 : Muscular system

- b) **Involuntary muscles:** These work on their own e.g. muscles of the stomach and intestine.
- c) **Cardiac muscles:** These are the muscles of the heart. These are also governed by the heart itself.

Muscles of upper extremity are Deltoid which help in flexion of the upper arm.

Muscles of the chest are External and internal intercostals and Diaphragm. These muscles elevate and depress ribs, enlarge chest and cause inspiration and vice versa.

Muscles of the thigh are Gluteal muscles which help in extension and rotation of the leg.

Functions

Functions of bones

- It gives support and shape to the body
- It protects the organ from any trauma and injury
- It helps in movement
- It helps to form blood cells
- It stores minerals i.e. Calcium which can be used in the body when required.

Functions of Muscles

- Movement of the body parts
- Maintenance of posture
- Production of body heat

In addition to bones and muscles we also have **ligaments and tendons** which form a part of the musculo-skeletal system. A tendon is a dense fibrous tissue attaching muscle to bone. e.g. eyeball is attached to bone by help of tendon. It also helps to move the bone. A ligament is a dense fibrous tissue that attaches bone to bone and holds them together.

Note:

The injuries to the musculoskeletal system cause the break in bones known as fractures and these fractures can also affect the joints. The fracture of skull and fracture of vertebral column are threatening since they can effect the associated underlying organs i.e. brain and spine. The fractures of long bone of arm or thigh and the fracture of hip are also life threatening since they can cause massive blood loss.

Sprains and strains often involve muscles, ligaments and tendons which get swelled up with injuries.

9) LYMPHATIC SYSTEM

The major function of this system is to make and circulate lymph which helps the body to fight infection.

Structure

As seen in Fig. 2.24, the major parts of lymphatic system are:

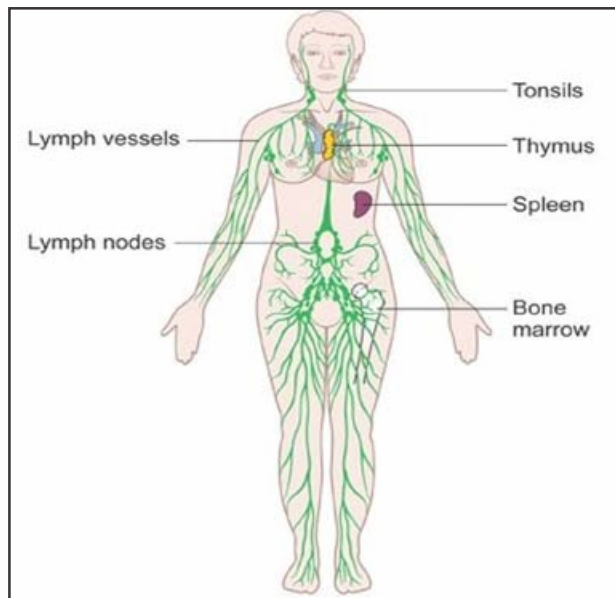


Fig. 2.24 : Lymphatic system

1) Lymph

Lymph is a fluid with high number of lymphocytes (white cells that fight infection) that circulates throughout the body in the lymphatic system. It is formed when tissue fluids/blood plasma drains into the lymphatic system.

2) Lymph vessels

These are tubes that carry lymph around the body.

3) Lymph nodes

Small bean-shaped glands that produce lymphocytes and filter harmful substances. Major lymph nodes are located in the tonsils, adenoids, armpits, neck and groin.

4) Thymus

It is located between the breast bone and heart. It produces lymphocytes and matures them.

5) Spleen

The spleen is an organ in the upper left abdomen, which filters blood, disposes off worn-out red blood cells, and provides a 'reserve supply' of blood.

Functions

The lymphatic system has following functions:

- Drains excess fluids and proteins from tissues and returns them back in blood.
- Removes waste products produced by cells.
- Fights infections.
- Absorbs fats and fat-soluble vitamins from digestive system and transports to blood.

10) ENDOCRINE SYSTEM

The endocrine system consists of glands that secrete hormones into the blood. These hormones, in turn, travel to different tissues and regulate various bodily functions.

Structure

As shown in Fig. 2.25, the major glands of the endocrine system are :

- 1) Pituitary gland
- 2) Thyroid gland
- 3) Parathyroid gland
- 4) Adrenal gland
- 5) Ovaries and Testes
- 6) Pancreas
- 7) Thymus

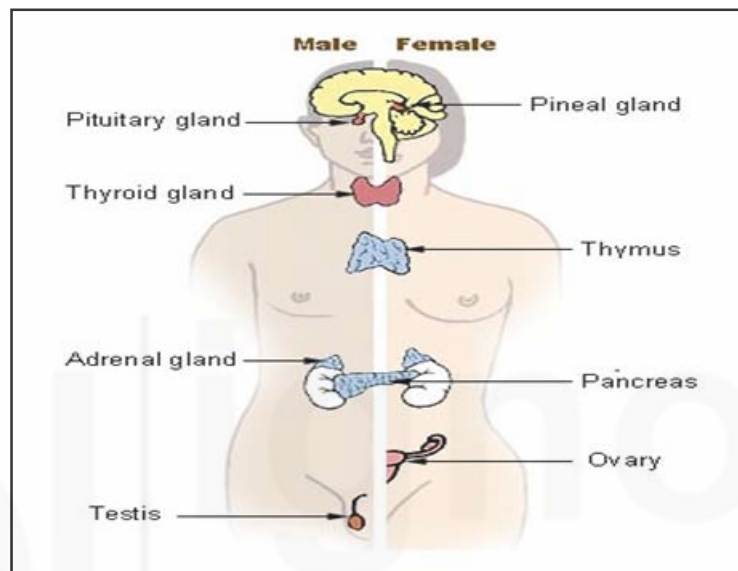


Fig. 2.25: Major Endocrine glands in the body

Let us discuss some major glands in detail as follows:

1) Pituitary gland

A small organ located just beneath the base of the brain. It controls other glands and is the 'master gland'. Different hormones are secreted by the pituitary as:

- Growth hormones controlling the growth of body.
- Hormones controlling the adrenal glands.
- Sex hormones which help to produce sperms in male and ovum in female.
- Function of milk production after delivery.

2) Thyroid gland and Parathyroid gland

Thyroid glands are two in number and present in front of the neck. The parathyroid glands are four in number and are present on the back and side of thyroid gland. The major function of the hormones secreted by the thyroid gland is to regulate rate of metabolism. The parathyroid hormone controls calcium level in the blood.

3) Adrenal gland

Each of the pair of adrenal glands lies above a kidney. These glands are responsible for the normal body functions, such as reproduction, reaction to stress by causing changes in heart rate, body glucose level and blood pressure and maintaining fluid balance.

4) Pancreas

It secretes insulin and glucagon. Insulin helps decrease the sugar level in the blood stream. Glucagon hormone stimulates the liver for the release of its stored sugar into the blood to increase the blood sugar level when needed.

5) Ovaries and Testes

You have already studied this in the section on Reproductive system in this Unit.

6) Thymus

You have already studied this in the section on Lymphatic system in this unit.

Functions

The endocrine system is made up of glands that produce and secrete hormones which are chemical substances that regulate the activity of cells or organs such as metabolism, growth and sexual function.

11) SENSORY SYSTEM

Along with skin, nose and tongue which we have discussed earlier, there are two more sense organs — eye and ear.

Structure

1) Eye

The eye ball is described as a globe, it is oval not circular. It is one inch in diameter, transparent in front and composed of various layers. The structure of eye is shown in Fig. 2.26. The outerpart of eye has covering of sclera which is the white portion. In the front, we have cornea which is transparent structure of sclera and has ring of colored tissue called iris with pupil which is adjustable opening in the centre to allow light to enter the eye and fall on Retina at the back to form image and allow us to see.

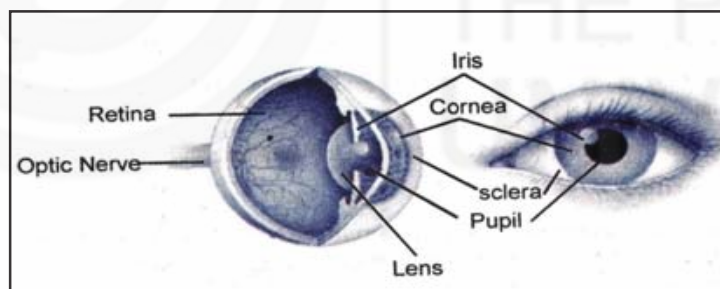


Fig. 2.26: Structure of the Eye

Conjunctiva is the mucus membrane lying under the eyelids and covering in front of the sclera. We also have lacrimal ducts which carry tears, lacrimal sac (tear gland) and nasolacrimal duct which connects nose and tear grand.

Appendages of the eye

You have already studied about eye lids and eyebrows in the section 2.3 of this unit.

2) Ear

The ear is organ of hearing. The ear is divided in three parts, external, middle and internal. The structure of ear is shown in Fig. 2.27.

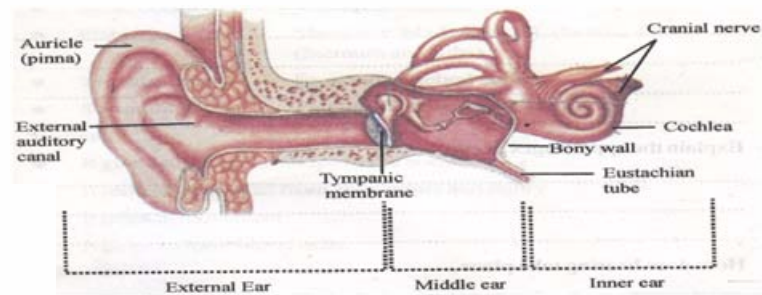


Fig. 2.27 : Structure of the Ear

The external ear

The external ear consists of the auricle or pinna, and the external auditory meatus which leads in from the pinna and conveys vibration of sound to the tympanic membrane or ear drum.

This canal is one inch long, it is directed upwards and backwards. It can be straightened by pulling the pinna upward and back.

The middle ear

The middle ear is a small chamber containing air, inside of the tympanic membrane or ear drum.

The internal ear

The internal ear consists of several cavities and channel. This channel contains fluid and nerve endings for hearing and balance.

Functions

Function of Eye (Vision)

The cells on the retina of the eye help in making vision possible by formation of image of the object and also colours are differentiated by the help of eye that helps to see various colors.

Function of ear (Hearing)

Sound wave passes along with external ear canal and causes tympanic membrane (ear drum) to vibrate. Vibration is transmitted to the internal ear and to the brain which helps to hear the pleasant or unpleasant sound.

Check Your Progress 4

1) Name any two hormones secreted by Pituitary gland.

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2) What is the composition of lymph?

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3) List the bones of human body.

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With this we finish the discussion on the various systems of the human body. Next we shall talk about the concept of Health and Illness.

2.5 HEALTH AND ILLNESS

In this section, we shall discuss the concept of health and illness in brief. It is important to know these concepts since, you as a first aid provider may have to differentiate between health and illness. So you need to be clear as to what these are.

Health

We understand the meaning of health but still we find difficulty in defining it. Different people have different perception of health. Some feel say that when an individual is free from any sickness or disease he is healthy; others feel or say that an individual is said to be healthy if s/he is able to perform activities of daily living normally.

In simple terms, Health is defined as:

- A series of successful and continuous adaptation to a continuously changing environment.
- Soundness of body or mind; that condition in which their function are duly and efficiently discharged. (Oxford English Dictionary)
- Health is a state of Physical, Mental , Social and Spiritual Well-being and not merely free from disease or infirmity. (WHO)

Physical well-being means having the physical strength and energy to work towards your goals. Mental well-being is ability to cope with the world; social well-being means development of relationships.

Ill Health or Illness

Ill health has been defined by Radford as the state in which a person is unable to adapt to the stresses of everyday living because of either lack of ease or signs of disease. Acute illness is the illness which develops suddenly. Chronic Illness is the illness which takes time to develop.

Hence acute illness are most oftenly the emergencies which a first aid provider encounters. As quickly as this acute illness develops, it also goes away quickly and persons become healthy sooner than incase of chronic illness.

As a first aid provider , you need to realize that these concepts are just a way to make you understand the difference between health and illness and how as a first aid provider you can differentiate a healthy and an ill person. Since, as a first aid provider, you will encounter various health related emergencies which you will also be studying in forth coming blocks, it is important to know that the acute illness or sudden developed emergency can put a person's health on the risk which you as a first aid provider should be able to deal in order to save life and help the person.

2.6 LET US SUM UP

In this unit we studied about the human body, the external and internal features of the human body including the various body systems. We also studied about the concept of health and illness. This unit on body and its systems is necessary to help you in recognizing the features and structure of the human body to deal with various problems that affect the body and provide first aid.

Hope you have enjoyed studying this unit and gained in-depth knowledge about the human body. We also hope that you will use this knowledge in dealing with human body and recognizing complications during emergencies to maintain the life of the victim. In the next unit, we shall be studying regarding the safety precautions that you need to follow as a first aid provider.

2.7 KEY WORDS

Complex	: Made up of smaller parts
Reproduce	: Produce offspring
Organization	: Arrangement of parts to make a whole
Perform	: Carry out/do
Organism	: A living being made up of cells and tissues which can perform its own functions
Conclude	: Bring to an end
External	: Outside
Internal	: Inside
Damage	: Harm
Chew	: Bite and work (food) in the mouth with the teeth
Pronounce	: Say in a correct way

Regulation	: Controlling and maintaining functions
Extend	: Cover a larger area
Deoxygenated	: Not having oxygen
Obstruction	: Blockage
Filter	: Strain out impurities
Contaminants	: Impure or poisonous substance which makes something impure
Urge	: Strong desire or impulse
Accessory	: Assisting or secondary
Fibre	: Protein material like a thin strip
Flexion	: Bending
Extension	: Enlarge in angle or amount
Vibration	: Act of vibrating/shaking
Perception	: Ability to see, hear, or become aware of something by senses.

2.8 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

- 1) a. torso b. forearm c. dust or other foreign bodies d. Ankle
- 2) i. b. ii. d. iii. f. iv. e.

Check Your Progress 2

- 1) Heart and Blood vessels –arteries, veins and capillaries.
- 2) a. False b. True c. False d. True e. True
- 3) 1) Controls other systems and functions of the body.
2) Controls behaviour, thought, response and awareness.
3) Controls posture, muscle function and balance.

Check Your Progress 3

- 1) Respiration and exchange of gases
- 2) Mouth , oesophagus, stomach , small and large intestine, rectum , anus and accessory organs of liver, pancreas and gall bladder.
- 3) a. Regulate BP. b. Make Vitamin D. c. Maintain pH of the blood.
d. Store and release Urine. e. Red Blood cell formation

Check Your Progress 4

- 1) Growth hormones and hormones to control adrenal glands
- 2) High number of lymphocytes formed from tissue fluids and blood plasma draining into the lymphatic system.
- 3) Refer section on Musculo-skeletal system (Section 2.4, point 8)

2.9 REFERENCES AND FURTHER READINGS

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UNIT 3 SAFE PRACTICES IN FIRST AID

Structure

- 3.0 Introduction
- 3.1 Objectives
- 3.2 Safe Practices
 - 3.2.1 Meaning and Purposes
 - 3.2.2 Safe Practices for the Environment
 - 3.2.3 Safe Practices for Victim
 - 3.2.4 Safe Practices for First Aid Provider
- 3.3 Infection Control
 - 3.3.1 Meaning and Purposes
 - 3.3.2 Universal/Standard Precautions
 - 3.3.3 Safety from Spills of Blood or Body Fluids and Waste Disposal
- 3.4 Let Us Sum Up
- 3.5 Key Words
- 3.6 Answers to Check Your Progress
- 3.7 References and Further Readings

3.0 INTRODUCTION

In the previous units of this block, you have learnt about first aid, roles of a first aid provider and have developed an understanding of the normal human body. In this unit, we will learn about the various safe practices in first aid.

Safety simply means being protected from danger, risk or injury. As a first aid provider, safety is very important for you and the person whom you want to save. It is important to remember 'Safety First' because if you don't think about safety, then everything you do to save the person may get wasted. Being observant and maintaining safety helps you to help others. For example, no one would like to be run over by a truck while trying to save a victim of road traffic accident or no one would want to get drowned while helping a victim who is drowning.

Thus, we need to practice certain measures by which we remain safe along with making the victim safe during the accident or emergency. These measures which maintain safety are called safe practices and these help to promote safety against infections or becoming a victim yourself.

This unit discusses safe practices and various infection control methods which the first aid provider must take into account for the purpose of preventing transmission of infection while providing first aid. The cause/source of infection can be anyone, either you or the victim and your first aid treatment can also produce wastes which can be hazardous and requires to be disposed carefully. It is hence, important to know and practice infection control measures for controlling infections.

Thus, in this unit, we will learn about the different aspects of safety, learn about safe practices and will discuss various safe practices to be used while giving first aid.

3.1 OBJECTIVES

After completion of this unit, you shall be able to:

- explain meaning and purposes of Safe Practices;
- discuss the safe practices for first aid provider, victim and environment and
- describe the infection control measures to be followed by the first aid provider.

3.2 SAFE PRACTICES

Let us now discuss what safe practices are and what the purposes of safe practices are.

3.2.1 Meaning and Purposes

Safe Practices simply mean the actions which ensure safety of the victim and of the first aid provider while giving first aid. The **safe practices** include various instructions which the first aid provider or the rescuer has to follow while dealing with emergency and providing first aid. The **safety of environment** is essential to avoid risk of further injury, e.g. if the victim has received an electric shock, the first priority of first aid provider will be to switch off the source of electric current to ensure the safety of the scene and avoid one-self from falling into problem him/herself. The **safety of victim** is another important aspect e.g. if the person is having fits, the first aid provider must remove any furniture or chairs found around the victim, so that he/she doesn't get injured (Fig. 3.1)



Fig. 3.1 : Removing Furniture around the person having fits to avoid injury

Moreover, the **safety of first aid provider** is also important to avoid infection and/or avoid problems to one self when helping a victim e.g. a person is getting drowned and the first aid provider is not trained in swimming but still jumps in water hoping to save the drowning person but both get drowned.

Thus, the first aid provider has to be alert, observant and smart in maintaining his safety and the safety of scene and the victim.

The **purposes** of safety practices are many. These include the following:

- Maintain safety of oneself to avoid getting injury or getting into any problem
- Avoid cross-infection
- Promote safety of the environment or area where the emergency has occurred
- Provide for safety of the victim to avoid further injury
- Reducing complications.

Therefore, it is clear by the above discussion that the safe practices include all the practices which ensure safety of environment, safety of the victim/person affected and the safety of the first aid provider along with prevention of transmission of infection through the use of various methods to protect oneself.

3.2.2 Safe Practices for the Environment

Know the environment! It is important for the first aid provider.....

A first aid provider can be challenged anywhere by the situation. You know that no one plans where the accident will occur. The first thing to do is to either take the victim away from the source or the environment or take the source/environment away from the victim. For example, in case of a road traffic accident, do not start the first aid for victim in the middle of the road, however urgent it may seem, make sure you take the victim to the side of road to ensure his and your safety because you may also meet with an accident in the middle of the road. Take another example, say that if someone is in a room of a building which has caught fire, we should remove the victim first from this building and then give first aid because for giving first aid you should move away from the building as the fire can kill you too. The news articles given in Fig. 3.2 give you an understanding into how the environment can create problem for victims as well as the first aid provider.

IAS trainee drowns in swimming pool trying to rescue woman officer DELHI (HTTP://WWW.HINDUSTANTIMES.COM/DELHI-NEWS) Updated: May 31, 2017 22.01 IST A 30-year-trainee IAS officer drowned trying to save a woman colleague in a swimming pool of the Foreign Service Institute in south Delhi's Ber Sarai around midnight on Monday, police said. Ashish Dahiya from Sonapat in Haryana was among more than two dozen young officers who gathered for a poolside party before leaving for their assigned place of duty. A woman who was Indian Revenue Service officer slipped into the 10-foot-deep pool. "Some of officers jumped in and rescued the woman," said Chinmoy Biswal, additional DCP (South). In the commotion they failed to notice Dahiya had disappeared. But the woman remembered that Dahiya too was among those who helped pull her out. She alerted her friends and a search began. They spotted Dahiya floating in water with his face down. Attempts were made to revive him. "One of the officers is a doctor and he applied cardiopulmonary resuscitation before rushing him to Fortis Hospital at 12.50 am, where doctors declared him dead on arrival. His family was in shock since he was a good swimmer and had once swum across the Bhakra Nagal dam on the Sutlej"	Noida: Worker falls into sewage plant well, dies, efforts on to rescue another Express News Service Noida Published: April 15, 2017 1:37 am A worker at a sewage treatment plant in Noida Sector 54 died while another went missing after they slipped and fell into a well on Friday evening. The body of Betwa (20) was recovered from the facility while rescue operations to find another worker — Mukund (19) — was on till the filing of this report late on Friday evening. According to police, the incident took place between 5-6 pm, when the facility was shut. "Two workers from the plant got caught in the well at around 5.30 pm. One man slipped and the other tried to pull him out and slipped in the process. We managed to pull out Betwa. He was rushed to the district hospital, where he was declared brought dead. Suction machines to recover the other worker have been brought. The rescue operation is still underway. Both workers are from Jharkhand. Post mortem examination is being conducted, and no FIR has been lodged in the case till now," said Vinay Singh, SHO, Noida Sector 24 police station.
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Noida fire tragedy: Brave 20-year-old HR manager Jasmeet died saving others [India TV News Desk, Noida (Published on:20 Apr 2017, 2:28 PM IST)]

An appalling incident shocked Noida on Wednesday when a huge fire broke out inside the factory of Excel Greentech in Sector 11, leaving six persons dead and several injured. While everyone struggled to save themselves, the company's HR Manager Jasmeet Kaur – a 20-year-old girl – decided not to flee and tried to save as many people as she could. Jasmeet, a resident of Punjab and a Delhi University BA (H) student, had joined the company as the HR Manager around seven months ago. When the fire broke at 12:45 pm, Jasmeet was at the fourth floor of the building. Instead of fleeing and saving her own life, she decided to save others. Tragically, while Jasmeet managed to save the lives of five of her colleagues, she failed to save herself.

Fig. 3.2: News Articles showing the importance of Safety Practices for environment

The above examples highlight the importance of being alert and aware about the problems and risks the environment can put before you when you attempt a rescue or when providing first aid to someone.

You should Remember the following points for maintaining safety of the environment:

- 1) Be observant and know the risks which environment poses before helping victim.
- 2) Use control measures to avoid risk to safety due to hazards in emergency situations.
- 3) One of the best methods is to remove the hazard.
- 4) Another method can be to remove contact with the hazard to avoid exposure such as removing the victim from the place.
- 5) One can also wear gloves, masks etc. to avoid contact with hazard or emergency causing situation .
- 6) Be alert for moving vehicles, mob attack, terror threat, robbery, animals, natural calamities like fire, cyclone, earthquake and many more.
- 7) Be careful for confined spaces which are the spaces having limited openings for entry and exit and improper ventilation like boilers, tanks, sewage/septic-tanks, pump-rooms, compressor rooms etc. Here one can die of suffocation due to toxic gases or fires or explosions.
- 8) Don't enter the space first or alone. When in doubt don't enter at all.
- 9) Never trust one's own senses to determine if the air in a confined space is safe. Many toxic gases and vapours can neither be seen nor smelled, nor can the level of oxygen present be determined.
- 10) Plan rescue and then proceed otherwise you can die while rescuing others.

Note: The key is to be alert! Always alert!

3.2.3 Safe Practices for Victim

One has to understand that chance favours the ones who are prepared. No one can predict when he/she may become a victim and need help. **A first aid provider needs to educate the victim for the following :**

- 1) In case one suffers from a chronic illness like diabetes keep a sugar candy in your pocket in case of low blood sugar, keep your inhaler in your pocket if you have asthma.
- 2) If you suffer from any other chronic illness like cancer, dementia, wear id band clearly stating your condition and emergency contact.
- 3) Keep a basic first aid box at home or even during travel.
- 4) Know your blood group.
- 5) Follow safety measures like seat belt, helmet, air bags installed in car.
- 6) Do not leave kids alone or unsupervised.
- 7) If you suspect injury to spine or neck do not move till stabilized.
- 8) Employ first aid emergency action steps carefully (discussed in Unit 1 of Next Theory Block).

These safe practices can only be put to use when the victim is known to the first aid provider at home or at workplace, school etc. In such situations, you as a first aid provider can give first aid and help the victim to be responsible for his health and condition and also you can prevent any emergency. However, in case of total strangers, you can educate them later on after helping.

3.2.4 Safe Practices for First Aid Provider

Each of us as an individual feels responsible for helping someone in a life-threatening situation, however dangerous it may be, but there is another side to being a hero too. Let us consider the following scenes before we make our mind on safety.

Scene I: A dairy farmer died from inhaling toxic fumes while working in an enclosed manure pit. Another farmer tried to save him and was also killed by the fumes. The farmer's wife and two daughters also jumped in, each trying to save the earlier victims, and also died. One tragic death quickly became five.

Scene II: A boat overturns in the middle of a big lake and on-lookers rush to rescue people, many are saved but when the death list comes out it can be seen that some names are of those persons who actually went to rescue and instead of saving victims became victims themselves.

Both the above scenes show that it is very important to take your safety as a first aid provider seriously; else you might become a victim and need another rescuer. If we look closely at what went wrong in the above cases, we see that it was the failure of first aid provider to assess the situation correctly before trying to help. In the first scene, the first aid provider made efforts in trying to physically reach the victim for help but did not consider the environment which had toxic gas mixed with the air and the second scene is one of the many terrible examples of persons coming to the rescue of a drowning victim but in process of helping others, they drown themselves.

Remember the following points as a first aid provider for maintaining your safety:

- 1) Remember that you are a first aid provider and are not that much professionally equipped to perform extensive first aid acts.
- 2) Be aware of the situation.
- 3) Learn from past incidents and be observant.
- 4) If you witness a tragedy, perform the first aid that you know or have been trained for.
- 5) Keep other people away from the hazard.
- 6) Do not act instinctively or impulsively. When you try to help or attempt a rescue, first evaluate the risks and understand your limitations—especially in situations involving closed spaces, gases and chemicals, fast/deep water, electricity, and moving traffic.
- 7) Always keep in mind that rescuers/first aid providers are at risk of becoming additional victims.
- 8) Know yourself, your weaknesses and strength, for example, if you suffer from fear of closed spaces/water etc. then you are not the best person to rescue or attend to an unconscious person in a closed space or a person who is drowning.

- 9) Remember it's your safety first! Use gloves if there is contact with blood and body fluid which may be contagious. You don't want to get any infection while helping someone else.
- 10) Remember Safe Practices of environment as discussed in section 3.2.2 of this unit.
- 11) Get help when needed. Remember you alone can't provide first aid in many situations.
- 12) Prioritize the order of first aid. No point in bandaging a wound if the person is not breathing nor has pulse. Take care of that.

The role of first aid provider in tragic accidents/emergency situations is not only to save the victim but also himself. Be alert, observant and have the knowledge of the situation which can save you as well as others. Safe practices help in ensuring that you are able to handle the situation properly for safety of yourself, the victim and the environment to avoid further complications. In addition to safety, infection control also needs to be exercised to avoid transmission of infections which are common in emergency situations. In the next section, we shall be talking about the infection control, methods of infection control and its purposes. So, let's continue.

Check Your Progress 1

- 1) Why does a first aid provider need to be aware of safety practices?
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- 2) Get some old news papers, find cases where loss of life of first aid provider happened while saving victim and try to think how would you help the victim, while keeping your safety first?
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3.3 INFECTION CONTROL

As already discussed, infection control is important safety practice. In this section, we will discuss this in detail.

3.3.1 Meaning and Purposes

Infection control is important during first aid. The reason for this is simply to avoid getting and giving infection with the aim to protect yourself and the victim. Anyone can cause and anyone can get infection if precautions are not taken. So, Infection control is important.

When a victim is injured or has a wound, his body is exposed to various infections as the skin is broken which is the first line of defence of body against infections as you have already studied in Unit 2 of this block. In the state of emergency, health of the victim is effected and he becomes vulnerable to catch infection either from the first aid provider or from various infectious germs present in the environment e.g. from unclean dressing, unwashed hands of first aid provider, dust, stone pieces, objects stuck on the wound etc.

If on the other hand, the victim already has some infection in his/her blood like HIV/AIDS, Hepatitis which we don't know as we are helping complete strangers when providing first aid. In such cases, the first aid provider can catch hold of infection if he comes in contact with the infected blood (or body fluids) and germs/infection causing agents may enter his body through cuts, wounds if he does not wear gloves, or by respiration and so on. So, both the victim and the first aid provider are at the risk of catching an infection.

Infection control helps in the following:

- Reduce cross infection from one person to another.
- Avoid further hazards due to dangerous blood/body fluid spills or wastes generated during the process of first aid.
- Removing infections in case of wounds/injuries.
- Protection from infection.

So, Infection control involves using procedures and supplies to avoid transferring infection by means of infection containing object/body fluid/blood from the victim with which the first aid provider may come in contact with or from first aid provider to the victim.

In the next subsections, we shall talk about the various infection control measures. So, let's begin.

3.3.2 Universal/Standard Precautions

These are certain precautions to be kept in mind and applied in order to prevent transferring the infection from one person to another while giving first aid. Infection can spread as a result of coming in contact with blood or body fluids of the victim who may be a stranger and we don't know if he/she has any infection. So, as a first aid provider you should consider that every person— his blood and body fluids are infectious as we don't know his/her status.

In order to protect ourselves from the infection, we can use various measures which prevent the transfer of infection from victim to first aid provider and vice versa known as universal/standard precautions.

The various universal/standard precautions are as follows:

1) Hand washing:

Hand washing is one of the most important method to decrease spread of infection. It simply means cleaning the hands to remove dirt and germs with soap and water. It not only helps to safeguard the first aid provider but also helps to remove the chances of infection transfer. The process of Hand-washing involves 6 steps as given in Fig.3.3 and should be performed likewise. It is most efficient way to prevent and control infection.

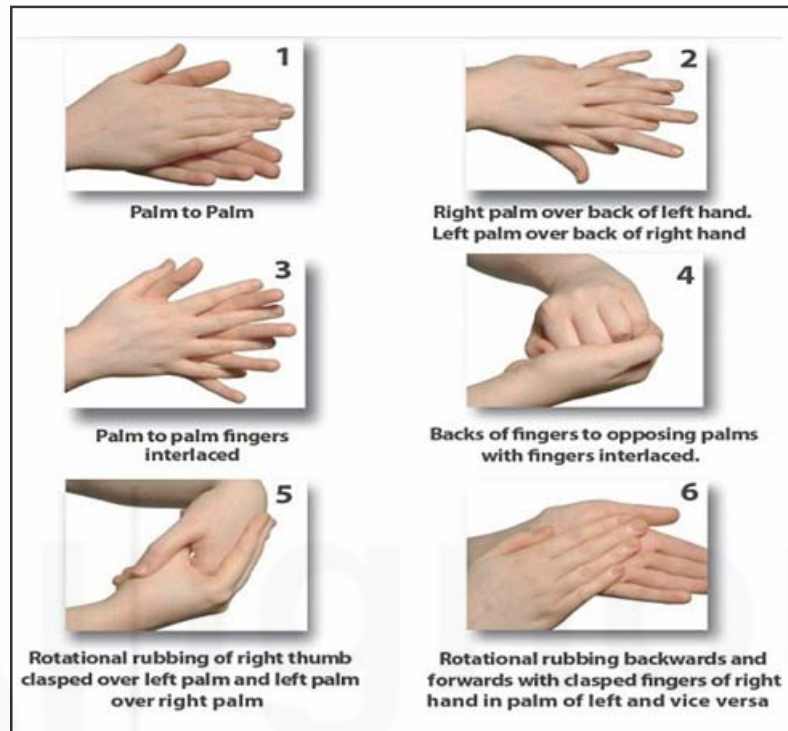


Fig.3.3: Six steps of Hand washing

You should Remember the following points while Hand-washing:

- i) Hands should be washed before and after giving first aid, tying dressing or bandage or any time the contact with the Victim is made.
- ii) Use soap and water to wash hands thoroughly.
- iii) Cover any cuts/open injuries on your hands with band-aid/waterproof dressings to avoid contact with blood.
- iv) Keep nails short if possible.
- v) Hand-washing is performed even after the use of gloves.
- vi) Wash any blood/body fluid in contact with skin with soap and water immediately.

The procedure for hand washing is discussed in Practical Unit 9, Block 1 of Practical Course 1 of this programme.

2) Barrier techniques/methods or Personal protective techniques (PPE):

These methods ensure reduction in spread of infection from one person to another. They also reduce chances of infection spread by air, coughing, touch, sneezing and so on. Most commonly used PPE are gloves, gown, mask and goggles.

All the personal protective equipments basically help to prevent contact with the infectious agent, blood or body fluids that may contain the infectious agent, by creating a barrier between the person and the infectious material.

The selection and use of PPE is based on the following criteria:

- **Type of exposure that may occur while giving first aid:** This is determined by the type of exposure, such as touch, splashes or sprays, or large volumes of blood or body fluids that might get into the clothing. e.g. If you think that only wound is there, then gloves are enough but if there is large amount of injury or blood loss then using gown is appropriate.
- Second, and very much linked to the first, is **the suitability of PPE** for the task. For example, whether a gown is selected for PPE, or if a gown is selected, whether it needs to be fluid resistant, fluid proof, or neither.
- Third is **fit**. PPE must fit the individual user. As a first aid provider many times it will be required that in the absence of resources you improvise to create PPE, but you must always try and make it fit so that the correct purpose is served.

With this as background, let's now discuss how to select and use specific PPE.

a) Gloves

Everyone knows what gloves are. A pair of gloves (Fig. 3.4) is used in various household activities. The basic use is to save the hands from coming in contact with anything that can stain or cause problem to the hands. In first aid, we should use gloves when touching blood, body fluids, secretions, contaminated items, wound, injury and so on. It acts as a barrier against catching infection from contaminated objects or fluids.



Fig. 3.4: Pair of Gloves

Remember

- 1) Use disposable gloves.
- 2) Use gloves before touching a wound, blood or other body fluids, wastes, sharps etc.
- 3) Use gloves whenever or wherever you do dressing on a wound.
- 4) Wash hands before and after gloving.

The procedure for wearing and removing gloves is discussed in Unit 9, Block 1 of Practical Course 1 of this programme.

b) Gowns/Apron

Gowns or aprons are used when the first aid provider suspects that there can be larger contact of his/her clothing/exposed skin with blood/body fluids, from the victim (Fig. 3.5). When using a gown use the right size that fits and fully covers you for better protection.



Fig. 3.5: Gown

The procedure for wearing and removing gown is discussed in Unit 9 of Practical Course 1, Block 1 of this Programme.

c) Mask

It is used when you suspect that you can catch hold of victim's infection by the air route (Fig. 3.6). Take for example, you come across an injured person who is coughing a lot and you may feel that you will get the infection from the person. In some cases, you yourself may have a respiratory infection which you don't want the victim to catch. Thus, in both the cases wearing a mask to protect your mouth and nose is useful for you and the victim. Masks may be tied with ties or with elastic.



Fig. 3.6: Mask

The procedure for wearing and removing mask is discussed in Practical Unit 9, Block 1 of Practical Course 1 of this programme.

d) Goggles/eye shield/face shield

These are used during activities that can produce splashes or sprays of blood, body fluids, secretions, or excretions (Fig. 3.7) . If eye protection is needed, either goggles or a face shield should be worn. Position either directly over the face and/or eyes and secure to head using the attached ear pieces or head band. Adjust to fit comfortably. Goggles should feel snug but not tight.



Fig. 3.7: Wearing goggles and face shield

The procedure for wearing and removing mask/goggles is discussed in Practical Unit 9, Block 1 of Practical Course 1 of this programme.

3.3.3 Safety from Spills of Blood or Body Fluids and Waste Disposal

Let us discuss these two aspects as follows:

1) Safety from spills

In case of heavy bleeding or blood spills over you, maintaining safety is important. For doing so, **remember the following points:**

- If blood or other body fluids are splashed, wash the area thoroughly with soap and water as soon as possible.
- If any of your clothing has been contaminated by blood or body fluids, remove it immediately.
- Wear gloves when cleaning up blood/body fluids. Use absorbent material to absorb blood/body fluids. Dispose this in a leak-proof, sealed waste bag.
- If eyes have splashes of blood, rinse with tap water.
- If blood gets in mouth, spit it out then rinse with water repeatedly.
- If the blood has spilled on floor, use absorbent material to clean this spill. This is discussed in Unit 9 of Practical Course 1.

2) Waste Disposal

Your first-aid waste is infectious and should be disposed carefully to avoid cross-infection. Usually, blood soaked dressings, bandages, gloves should be placed in a plastic or paper bag. It should be burnt or taken to medical facility or handed over to ambulance, medical/paramedical staff to be taken to hospital for safe disposal. Used scissors or forceps/tweezers should be cleaned thoroughly under running cold or warm water. This is further discussed in Unit 9 of Block 1 of Practical Course 1 of this Programme.

Thus, in this section on infection control we discussed the various infection control measures and their utilization. Hope you will take care of your safety and that of the victim by applying these precautions.

Check Your Progress 2

- 1) List the Universal Precautions important for prevention of infection.

.....

- 2) Enumerate the points to be taken care when dealing with blood spills while providing first aid.

.....

3.4 LET US SUM UP

In this unit, we discussed the various safe practices in first aid to be followed by the first aid provider. It is important as a first aid provider to know regarding various safety practices to be maintained during the exposure to the victim and while giving first aid. Hence, you also learnt about the safe practices with regards to the rescuer, victim and environment to be maintained for safety. You also learnt about infection control and waste disposal which needs to be practiced while providing first aid. It is important to emphasize here that as a first aid provider you should have the knowledge about the safe practices and infection control measures to maintain your and the victims safety. Hope you will use this knowledge in various situations you encounter while giving first aid.

3.5 KEY WORDS

Danger/Risk/Hazard	: A situation that can cause harm
Drown	: Die by getting under water
Measures	: As a noun to be used for plan or course of action taken
Transmission	: Passing on from one to another
Dispose	: Throw away safely
Instructions	: Detailed information/rules/orders about something
Follow	: Go after or come after something
Practices	: Application of idea or method

Challenge	: A situation that can question your knowledge, worth or ability
Calamities	: Disasters like floods, landslides etc.
Confined	: Closed space with less area/volume
Ventilation	: Providing fresh air/sunlight
Suffocation	: Difficulty in breathing
Senses	: The organs by which body feels sensations
Toxic gases	: Poisonous gases
Vapours	: Substance diffused or suspended in the air
Rescue	: Free from danger
Unsupervised	: Not under supervision or not under control
Stabilize	: Make comfortable
Life-threatening	: Situation which is fatal or can take away ones life
Terrible	: Very Bad
Instinctively	: Without thinking/Impulsively
Limitations	: A level beyond which you can't act or are restricted to act
Exercise	: Use or apply
Precautions	: Measure taken to prevent dangerous situation
Defence	: Protection
Vulnerable	: Having the possibility of getting harmed
Infection causing agents	: Germs like bacteria ,virus which cause Infection
Enter	: Go or get into something
Procedures	: Series of action done in certain manner
Safeguard	: Protect From
Thoroughly	: Fully or completely
Reduction	: Decrease
Barrier	: Blocking to reduce transfer or exchange
Spills	: Flowing of large amount of liquid like water/ blood
Spit	: Eject saliva etc. out of mouth forcefully.

3.6 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

1) The reasons are as follows:

- Maintain safety of oneself to avoid getting injury or getting into any problem.

- Avoid cross-infection.
- Promote safety of the environment or area where the emergency has occurred.
- Provide for safety of the victim to avoid further injury
- Reducing complications.

Check Your Progress 2

- 1) The Universal Precautions are:
 - Handwashing
 - Use of Personal Protective clothing
- 2) Refer Section 3.3.3

3.7 REFERENCES AND FURTHER READINGS

1. <http://www.ada.org/en/member-center/oral-health-topics/occupational-safety-and-health-administration>
2. <https://www.cdc.gov/infectioncontrol/guidelines/index.html>
3. http://www.iacs.org.uk/media/2723/rec_72_pdf212.pdf
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